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ABSTRACT

The use of information and communication technologies (ICT) in continuing health professional education (CHPE) was examined in a national survey of Canadian CHPE providers. Of the 3,044 surveys distributed to schools of medicine, nursing, and pharmacy, national/provincial health professional associations, nonprofit health advocacy organizations, the pharmaceutical industry, and hospital/health care organizations, 677 were returned (overall response rate 22.2%). Selected findings were as follows: (1) Canadian schools of medicine and nursing are responsible for a significant amount of the technology-based distance education (DE) programs offered as CPHE to health professionals; (2) existing educational technology resources and expertise within an organization are important factors influencing the likelihood of CHPE organizational units being providers of technology-based DE; (3) financial gain-related factors do not influence an academic CHPE organizational unit's decision to provide technology-based DE; (4) hospital/health care management boards favor technology-based DE as a more cost-effective means for addressing health professionals' CHPE requirements; (5) partnering appears to be a significant characteristic of technology-based DE; and (6) participants in technology-based CHPE are varied and include experienced health professionals. (Twenty-nine tables/figures and 82 references are included. The following items are appended: the provider survey; a facilitator's guide to online conferencing; and a best practices document in distance education.) (MN)

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Information and Communication Technologies and Continuing Health Professional Education in Canada

A Survey of Providers
Final Report

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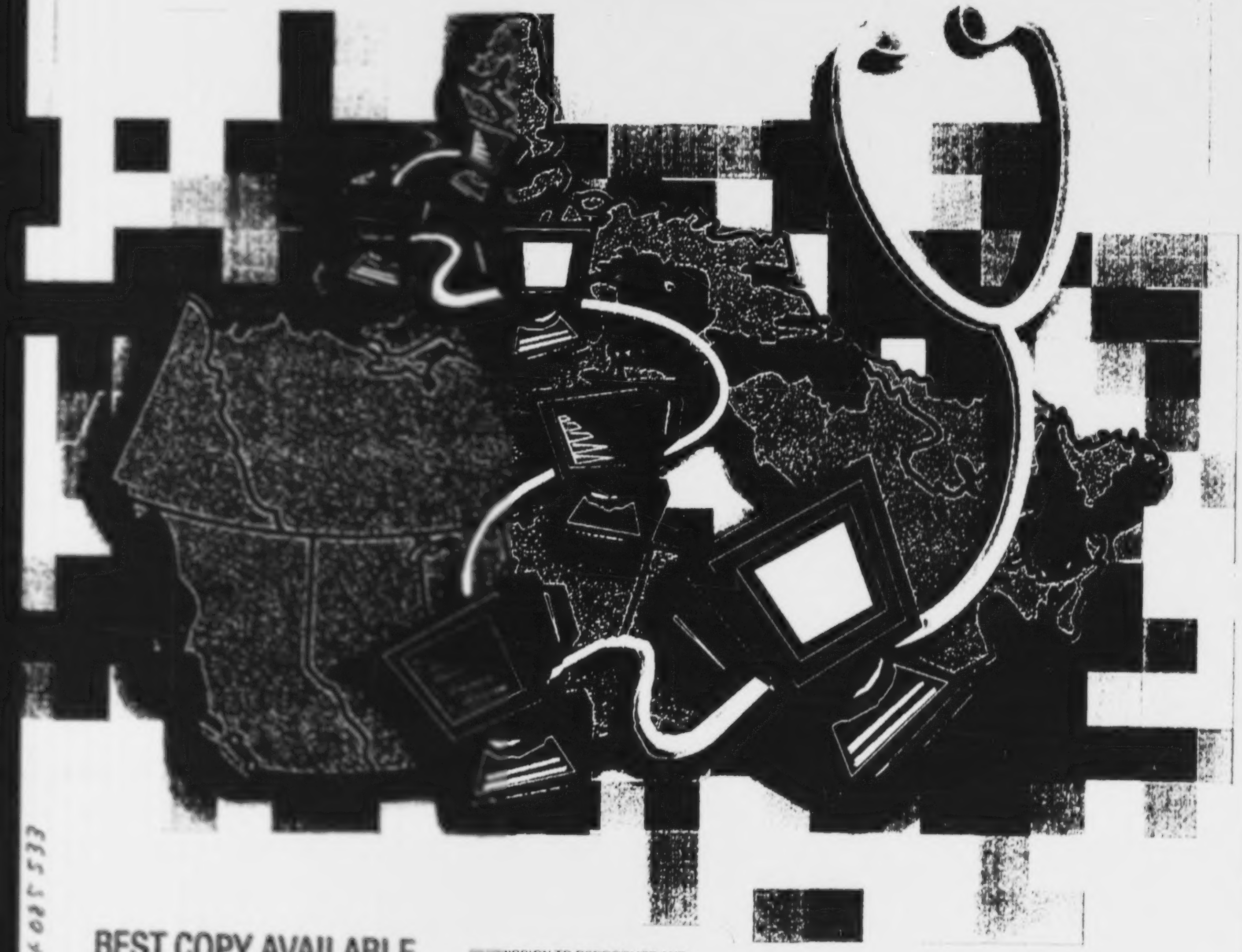

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Information and Communication Technologies and Continuing Health Professional Education in Canada

A Survey of Providers Final Report

Submitted by:
Office of Professional Development
Faculty of Newfoundland
Memorial University of Newfoundland

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The Royal College of Physicians and Surgeons of Canada
Le Collège royal des médecins et chirugiens du Canada

UNIVERSITY OF CALGARY

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Partners and members of the Project Team

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ZeddComm

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Executive Summary

One of the distinguishing characteristics of a profession is the commitment by its members to lifelong learning. In order to provide high-quality health care services, health professionals require access to effective ongoing professional development and continuing education programs. With the rapid advances which are occurring in the health sciences, it is becoming increasingly challenging for health care professionals to stay abreast of the latest health research information. Knowledge in the health sciences is constantly expanding as new information is published, disseminated, and quickly updated or revised. In this context, the health care practitioner is placed in the unenviable position of having to provide the best health care to the public while trying to use and apply a rapidly changing body of knowledge.

The provision of an equitable and sustainable level of health care in rural communities is challenged because of problems in recruiting and retaining rural health care providers. Rural health care delivery is a demanding and challenging form of practice regardless of the profession. As an example, the rural physician or nurse practitioner frequently practices in an isolated environment with inadequate resources and limited or distant specialist back-up resources. This isolation necessitates a level of clinical competence beyond that of their urban health care peers. It has been reported that rural health care providers perceive their opportunities for participation in traditional continuing health professional education as inadequate. The sense of professional isolation which results from a lack of continuing education opportunities also influences feelings of job dissatisfaction with rural practice.

In Canada, the trend appears to be towards greater use of information and communication technologies (ICTs) in the health care system and in the continuing education of health professionals. ICTs have an important role to play in addressing recruitment and retention challenges, facilitating the maintenance of competencies among rural health care providers, and enhancing the quality of care provided to rural and remote communities. The objectives of the study described in this report were twofold. First, we were interested in identifying the extent and level of ICT usage among Canadian continuing health professional education (CHPE) providers. Second, we were also interested in assessing the type of ICT-related training and educational programming which is being provided by Canadian CHPE providers. A greater understanding of efforts to educate health professionals in the integration and usage of ICTs in health care practices and how Canadian CHPE providers are utilizing ICTs to deliver continuing professional education will contribute to effective decision and policy-making that impacts the health and health care of all Canadians.

A national questionnaire-survey of Canadian CHPE providers was conducted to meet the project goals. The survey was designed by the research team and validated by an advisory committee. The questionnaire-survey items were developed from a review of relevant and available literature. The survey was designed to collect information concerning: the technologies being used to deliver distance education programs; factors which influence decisions to offer technology-based distance education; source(s) of support and available resources for technology-based distance education programs; and the type(s) of CHPE programs being offered in the areas of ICT-related training and education.

A total of N = 3,044 surveys were distributed between September and December 2002. The target CHPE provider audience included schools of medicine (N = 16), nursing (N = 135), and pharmacy (N = 9). It also included national/provincial health professional associations and non-profit health advocacy organizations (N =101), the pharmaceutical industry (N = 56), and hospital/health care authority organizations (N = 2,727). Six hundred and seventy-seven (N = 677) surveys were returned. School of Medicine and School of Pharmacy organizational respondents provided the highest response rates, 62.5% and 55.6% respectively. Fifty-eight (N = 58) of 135 School of Nursing questionnaire-surveys were returned for a response rate of 43%. Forty-seven (N = 47) of 101 surveys were completed by national/provincial health professional associations for a response rate of 46.5%. The response rates for the pharmaceutical industry and the hospital/health care management board organizational categories were less than expected. Only 15 of 56 pharmaceutical industry organizational respondents completed and returned surveys; a response rate of 26.8%. The lowest response rate (19.9%) was received from hospital/health care management board organizational respondents.

The main findings of the survey include:

- Canadian schools of medicine and nursing are responsible for a significant amount of the technology-based distance education programs which are offered as CHPE to health professionals.

- Canadian schools of medicine and nursing report the highest level of experience in technology-based distance education programs which are offered as CHPE to health professionals.

- Existing educational technology resources and expertise (human, technical and infrastructure) within an organization are important factors influencing the likelihood of a CHPE organizational unit being a provider of technology-based distance education programs.

- Factors related to 'financial gain' do not influence an academic CHPE organizational unit's decision to provide technology-based distance education. Academic CHPE providers are more likely to provide technology-based distance education as a means for addressing needs of rural/remote health professionals; to increase opportunities for flexible CHPE access; and to fulfill an organization's mission.

- Hospital/health care management boards favor technology-based distance education as a more 'cost-effective' means for addressing mandatory CHPE needs of health professionals.

- Schools of medicine report a high level of dependency on 'industry' funding as a means of support for technology-based distance education program development and delivery.

- Partnering, whether that be with other organizations and institutions or other internal departments, appears to be a significant characteristic of technology-based distance education program development and delivery by Canadian CHPE providers.

- Schools of medicine reported a lower level of importance on forming partnerships with other internal departments in the parent institution when compared to other academic organizations.

- Partnerships with provincial and federal government organizations and community-based agencies were not identified as significant partnership types.

- Internet-based technologies (e.g. E-mail and the World Wide Web) and videoconferencing are the most common educational technologies used by CHPE providers in technology-based distance education programming.

- Technology-based Canadian CHPE providers are mostly targeting 'regional' and 'provincial' audiences; not international.

- Participants in technology-based CHPE programs are varied and include experienced health professionals.

- School of medicine and hospital/health care management board respondents are addressing the needs of a predominantly rural practitioner audience. Schools of nursing are addressing the needs of both urban and rural practitioners through their technology-based CHPE programs.

- The most common ICT-related CHPE topics being provided to Canadian health professionals include: using computers; e-mail applications; using the Internet; presentation software; and hospital computer systems.

- Providers of technology-based CHPE distance education programs are more likely to report a positive perception of: supportive organizational factors; technological infrastructure, access to equipment and Internet services; and level of computer experience, enthusiasm and commitment among their distance education programming target audience.

The main recommendations which stem from the study findings include:

1. ICTs play a significant role in the delivery of CHPE programming which addresses the mandatory continuing professional education and lifelong learning needs of rural, remote and northern health professionals. These technologies are essential in facilitating effective distance education programming which maintains the competencies of these practitioners and reduces the level of professional isolation they experience. Access to and use of ICTs in CHPE delivery are vital components of any effective strategy to enhance retention and recruitment of rural health care providers.

2. Academic institutions are responsible for providing the majority of CHPE programming via technology-based distance education. Academic institutions view this programming as an important part of their mission and commitment to addressing and supporting the lifelong learning needs of health professionals, particularly those practicing in rural and remote regions of Canada.

3. The Internet and videoconferencing are the main educational technologies which are being used by Canadian CHPE providers in the delivery of technology-based continuing professional education.

4. Organizational support is a critical factor in the development and expansion of resources for the successful and sustainable delivery of technology-based distance education to rural and remote health professionals.

5. The use of ICTs in the delivery of CHPE places unique and special demands on instructors and subject matter experts (SMEs) who are unfamiliar with these technologies in training and educational delivery. Faculty and instructional development support are key services to assist instructors and trainers in the effective use of ICTs in continuing professional education.

6. Health professionals require a fundamental understanding of ICTs so they are able to utilize these technologies in pursuing lifelong and continuing professional education opportunities. Appropriate stakeholders need to ensure that optimal efforts are made to provide CHPE opportunities so health care practitioners are able to develop the skills needed for optimal use of ICT systems.

7. Technology-based CHPE development and delivery costs are generally higher than those associated with face-to-face CHPE delivery. Many organizations undertake these programs as a means for addressing the mission of their institution or for addressing the mandatory CHPE requirements of rural, remote and northern health professionals. External funding to support such initiatives is essential to offset those costs which are normally not covered in institutional operating budgets.

8. Partnerships involve the combining of expertise and resources. Partnerships are essential in the development and delivery of technology-based CHPE. Partnering enables the avoidance of duplication and allows organizations to share limited resources, equipment and infrastructure. CHPE providers need to partner with other organizations and communities in the development and delivery of technology-based CHPE programs to ensure program sustainability and acceptance. Municipal, provincial and federal levels of government have a role to play in encouraging, facilitating and supporting such partnerships.

9. Governments have an important role to play in stimulating efforts in the development and delivery of technology-based CHPE. Apart from funding to support the development and delivery of technology-based CHPE and appropriate technological infrastructure networks, there is a role for government to play in facilitating partnerships between institutions and organizations.

Sommaire

Une des caractéristiques distinctives d'une profession est l'engagement de ses membres envers l'apprentissage à vie. Pour être en mesure d'offrir des services de santé de grande qualité, les professionnels de la santé doivent pouvoir accéder à des programmes soutenus et efficaces de perfectionnement professionnel et de formation continue. Face aux développements rapides dans le domaine des sciences de la santé, il devient de plus en plus difficile pour les professionnels de la santé de se tenir à la fine pointe de l'information en matière de recherche sur la santé. Les connaissances dans le domaine des sciences de la santé prennent sans cesse de l'ampleur à mesure que les nouveaux renseignements sont publiés, diffusés, puis rapidement mis à jour ou révisés. Dans ce contexte, le prestateur de soins de santé est mis dans la position peu enviable d'avoir à offrir les meilleurs soins de santé au public tout en essayant d'utiliser et de mettre en application un ensemble de connaissances qui évolue rapidement.

La prestation d'un degré équitable et soutenable de soins de santé dans les communautés rurales est chose difficile à cause des problèmes de recrutement et de maintien de prestateurs ruraux de soins de santé. La prestation de soins de santé en milieu rural est une forme de pratique à la fois exigeante et pleine de défis, peu importe la profession. Par exemple, le médecin rural ou l'infirmière praticienne rurale exerce souvent dans un milieu isolé et dépourvu de ressources adéquates, disposant de ressources spécialisées d'appoint limitées ou éloignées. Cet isolement nécessite un degré de compétence clinique dépassant celui de leurs pairs urbains dans les mêmes domaines. Il a été signalé que les prestateurs ruraux de soins de santé perçoivent leurs possibilités de participer à une formation continue traditionnelle comme étant inadéquates. Le sentiment d'isolement professionnel résultant du manque de possibilités de formation continue influence également les sentiments d'insatisfaction professionnelle à l'égard de la pratique rurale.

Au Canada, la tendance semble pencher vers une utilisation plus répandue de technologies de l'information et des communications (TIC) dans le système de soins de santé et pour la formation continue des professionnels de la santé. Les TIC jouent un rôle important vis-à-vis des défis du recrutement et du maintien de l'effectif, de la facilitation du maintien des compétences chez les prestateurs ruraux de soins de santé, et de l'amélioration de la qualité des soins offerts dans les collectivités rurales et éloignées. Les objectifs de l'étude décrite dans le présent rapport étaient doubles. D'abord, nous voulions identifier l'étendue et le degré d'utilisation des TIC chez les fournisseurs canadiens de FCPS. Ensuite, nous voulions également évaluer les types de programmes d'apprentissage et de formation axés sur les TIC offerts actuellement par les fournisseurs canadiens de FCPS. Une meilleure compréhension des efforts déployés pour éduquer

les professionnels de la santé à l'égard de l'intégration et de l'utilisation des TIC dans les pratiques de soins de santé et des méthodes employées à cet égard par les fournisseurs canadiens de FCPS pour dispenser la formation professionnelle continue contribuera à des prises de décisions et à l'adoption de politiques efficientes qui auront des incidences sur la santé et les soins de santé de tous les Canadiens.

Un sondage par questionnaire national a été mené auprès de fournisseurs canadiens de FCPS afin de réaliser les objectifs du projet. Le sondage a été élaboré par l'équipe de recherche et a été validé par un comité consultatif. Les questions du sondage ont été fondées sur l'examen de la littérature pertinente disponible. Le sondage a été conçu en vue de recueillir de l'information relativement: aux technologies employées pour offrir les programmes de formation à distance; aux facteurs qui influencent les décisions d'offrir une formation à distance technicisée; aux sources d'appui et aux ressources disponibles aux programmes technicisés de formation à distance; et aux types de programmes de FCPS offerts dans les domaines d'apprentissage et de formation fondés sur les TIC.

Un total de N = 3044 questionnaires ont été distribués de septembre à décembre 2002. Les fournisseurs de FCPS ciblés comprenaient des écoles de médecine (N = 16), de sciences infirmières (N = 135) et de pharmacie (N = 9). On s'est également adressé à des répondants d'associations nationales ou provinciales de professionnels de la santé et d'organisations de défense sans but lucratif en matière de santé (N =101), de l'industrie pharmaceutique (N = 56) et d'organisations hospitalières ou de soins de santé (N = 2727). Six cent soixante dix-sept (N = 677) questionnaires ont été retournés. Les répondants d'écoles de médecine et de pharmacie ont donné le taux de réponse le plus élevé, soit de 62.5% et 55.6% respectivement. Cinquante-huit (N = 58) des 135 questionnaires distribués aux écoles de sciences infirmières ont été retournés, donnant un taux de réponse de 43.0%. Quarante-sept (N = 47) des 101 questionnaires distribués aux associations nationales ou provinciales de professionnels de la santé ont été retournés, pour un taux de réponse de 46.5%. Les taux de réponse pour l'industrie pharmaceutique et des organisations hospitalières ou de soins de santé étaient inférieurs aux prévisions. Seulement 15 des 56 répondants de l'industrie pharmaceutique ont rempli et retourné leurs questionnaires, donnant un taux de réponse de 26.8%. Le plus faible taux de réponse (19.9%) a été affiché par les répondants d'organisations hospitalières ou de soins de santé.

Voici quelques-unes des principales conclusions du sondage:

- Les écoles canadiennes de médecine et de sciences infirmières se chargent d'un nombre considérable de programmes technicisés de formation à distance offerts sous forme de FCPS aux professionnels de la santé.

- Les écoles canadiennes de médecine et de sciences infirmières affichent le degré d'expérience le plus élevé en matière de programmes technicisés de formation à distance offerts sous forme de FCPS aux professionnels de la santé.

- Les ressources et expertises existantes (humaines, techniques et infrastructure) en matière de technologie éducative au sein d'une organisation sont des facteurs importants qui influencent la probabilité qu'une unité organisationnelle chargée de la FCPS devienne un fournisseur de programmes technicisés de formation à distance.

- Les facteurs associés au profit financier n'influencent pas la décision d'une unité organisationnelle universitaire chargée de la FCPS d'offrir une formation à distance technicisée. Il est plus probable que les fournisseurs universitaires de FCPS offriront une formation technicisée à distance afin de répondre aux besoins de professionnels de la santé en régions rurales ou éloignées; afin d'accroître et d'assouplir les possibilités d'accès à la FCPS; et afin de réaliser la mission d'une organisation.

- Les conseils de gestion d'organisations hospitalières ou de soins de santé préfèrent la formation technicisée à distance comme moyen plus rentable de répondre aux besoins obligatoires des professionnels de la santé en matière de FCPS.

- Les écoles de médecine signalent une grande dépendance envers le financement par l'industrie pour appuyer l'élaboration et la prestation de programmes de formation technicisée à distance.

- Les partenariat, que ce soit avec d'autres organisations ou institutions ou d'autres services internes, semble caractériser beaucoup l'élaboration et la prestation de programmes de formation technicisée à distance par les fournisseurs canadiens de FCPS.

- Les écoles de médecine ont indiqué qu'elles accordent une moindre importance à la formation de partenariats avec d'autres services internes au sein du même établissement contrairement à d'autres organisations universitaires.

- Les partenariats avec des organismes gouvernementaux provinciaux ou fédéraux ou les organismes communautaires ne figuraient pas parmi les types de partenariats importants.

- Les technologies axées sur Internet (p. ex. le courriel et le Web) et la vidéoconférence sont les technologies éducatives les plus couramment employées par les fournisseurs de FCPS pour

  leurs programmes de formation technicisée à distance.

- Les fournisseurs canadiens de FCPS technicisée ciblent surtout les publics régionaux et provinciaux, non pas les marchés internationaux.

- Les participants aux programmes technicisés de FCPS sont divers et comprennent des professionnels de la santé d'expérience.

- Les répondants de conseils de gestion d'écoles de médecine ou d'hôpitaux ou d'établissements de soins de santé cherchent à répondre aux besoins d'un public composé en grande partie de praticiens ruraux. Les écoles de sciences infirmières répondent aux besoins à la fois des praticiens urbains et ruraux par leurs programmes de FCPS technicisée.

- Parmi les sujets de FCPS associés aux TIC le plus souvent offerts aux professionnels canadiens de la santé, notons: l'utilisation de l'ordinateur; les logiciels de courrier électronique; l'utilisation d'Internet; les logiciels de présentation; et les systèmes informatiques en milieu hospitalier.

- Les fournisseurs de programmes FCPS technicisés de formation à distance signaleront plus probablement une perception positive: de facteurs organisationnels positifs; de l'infrastructure technologique, de l'accès à l'équipement et des services Internet; et du degré d'expérience informatique, d'enthousiasme et d'engagement chez le public ciblé par leurs programmes de formation à distance.

Parmi les principales recommandations émanant des conclusions de l'étude, notons :

1. Les technologies de l'information et des communications (TIC) jouent un rôle significatif dans la prestation de programmes de formation continue pour les professionnels de la santé (FCPS) qui répondent aux besoins fondamentaux en formation professionnelle continue et an apprentissage à vie des professionnels de la santé exerçant dans les régions rurales, éloignées et septentrionales. Ces technologies sont essentielles à la facilitation de programmes efficaces de formation à distance visant à maintenir les compétences de ces

praticiens et à réduire le degré isolement professionnel qu'ils ressentent. L'accès aux TIC et leur utilisation dans la prestation de FCPS sont des composantes vitales de toute stratégie efficace visant à accroître le maintien et le recrutement de prestateurs ruraux de soins de santé.

2. Les établissements universitaires sont chargés de fournir la plupart des programmes de formation continue pour les professionnels de la santé (FCPS) par le biais d'une formation à distance technicisée. Les établissements universitaires considèrent que ces programmes constituent une importante partie de leur mission et de leur engagement à répondre aux besoins en matière d'apprentissage à vie des professionnels de la santé et à les appuyer, et particulièrement ceux exerçant dans les régions rurales et éloignées du Canada.

3. Internet et la vidéoconférence sont les principales technologies éducatives utilisées par les fournisseurs canadiens de formation continue pour les professionnels de la santé (FCPS) dans la prestation de la formation professionnelle continue technicisée.

4. L'appui organisationnel est un facteur fondamental au développement et à l'expansion des ressources nécessaires à la prestation réussie et soutenue de la formation à distance technicisée aux professionnels de la santé des régions rurales et éloignées.

5. L'utilisation des technologies de l'information et des communications (TIC) dans la prestation de formation continue pour les professionnels de la santé (FCPS) impose des fardeaux à la fois uniques et particuliers aux instructeurs et aux experts en la matière (EM) qui ne sont pas familiers avec ces technologies dans la prestation de programmes d'apprentissage et de formation. L'appui du corps professoral et du développement pédagogique est un service clé pour aider les instructeurs et formateurs à utiliser efficacement les TIC en formation professionnelle continue.

6. Les professionnels de la santé nécessitent une compréhension fondamentale des technologies de l'information et des communications (TIC) afin d'être en mesure d'utiliser ces technologies pour tirer profit des possibilités d'apprentissage à vie et de formation professionnelle continue. Les intervenants appropriés doivent veiller à ce que tous les efforts possibles soient déployés afin d'offrir des possibilités de formation continue pour les professionnels de la santé (FCPS) de sorte que les praticiens des soins de santé soient en mesure d'acquérir les compétences voulues pour tirer pleinement avantage des TIC.

7. Les coûts d'élaboration et de prestation des programmes technicisés de formation continue pour les professionnels de la santé (FCPS) sont généralement plus élevés que ceux associés à une prestation FCPS face à face. Plusieurs organisations entreprennent ces programmes afin de réaliser leur propre mission ou de répondre aux besoins fondamentaux en matière de FCPS des professionnels de la santé exerçant en régions rurales, éloignées ou septentrionales. Il est essentiel d'avoir recours à un financement externe pour appuyer de telles initiatives afin de

défrayer les coûts qui ne sont normalement pas couverts par les budgets d'exploitation des établissements.

8. Les partenariats ont pour effet de combiner expertise et ressources. Ces partenariats sont essentiels à l'élaboration et à la prestation de programmes technicisés de formation continue pour les professionnels de la santé (FCPS). Le partenariat permet d'éviter les dédoublements d'efforts et permet aux organisations de partager des ressources, équipements et infrastructures limités. Les fournisseurs de FCPS doivent établir des partenariats avec d'autres organisations et communautés pour l'élaboration et la prestation de programmes technicisés de FCPS afin d'assurer la viabilité et l'acceptation de ces programmes. Pour leur part, les paliers municipal, provincial et fédéral de gouvernement ont un rôle à jouer pour encourager, faciliter et appuyer de tels partenariats.

9. Les gouvernements ont un rôle important à jouer pour stimuler les efforts d'élaboration et de prestation de programmes technicisés de formation continue pour les professionnels de la santé (FCPS). Outre l'appui financier à l'élaboration et à la prestation de programmes FCPS technicisés et à l'établissement de réseaux d'infrastructure technologique appropriés, les gouvernements peuvent également faciliter les partenariats entre institutions et organisations.

Introduction

The provision of an equitable and sustainable level of health care in rural communities has been a challenge to the Canadian health care system for some time (Tepper & Rourke, 1999; Rourke, 1997; Hutten-Czapski, 1998). Rural communities have suffered from a shortage of primary care physicians and other health care providers for many years and have felt the chronic shortage longer and more severely than urban areas (Ramsey, Coombs, Hunt, Marshall & Wenrich, 2001). There are many obstacles with regard to recruiting and sustaining an adequate supply of rural health care providers. Common deterrents are usually related to a lack of time for family and leisure, lack of work and educational opportunities for family members, professional isolation, lack of professional development opportunities, low salaries, poor locum support, underfunded hospital services, and over-scheduling (Rourke, 1993; Rourke, 1994). Each rural setting has its own special challenges. In the smallest, most remote communities, help is a long time and distance away. This places immense strain on limited local resources and on the health care provider, particularly when emergencies occur.

Rural health care delivery is a demanding and challenging form of practice regardless of the profession. As an example, the rural physician or nurse practitioner frequently practices in an isolated environment with inadequate resources and limited or distant specialist back-up resources. This isolation necessitates a level of clinical competence beyond that of their urban health care peers. The rural physician, in particular, is often expected to perform a generalist role in every aspect of clinical practice. Because of this, she must develop and maintain a special base of knowledge and technical skill in a variety of clinical areas, particularly in those related to rural medicine - emergency medicine, obstetrics and anesthesia (Rourke, 1988; Woolf, 1991; Kamien & Buttfield, 1990; Gill & Game, 1994).

Several studies have confirmed the existence of unique continuing medical education needs among rural physicians (Rourke, 1988; Woolf, 1991; Kamien & Buttfield, 1990; Gill & Game, 1994). Some studies have also found significant differences between the continuing medical education needs of rural and urban medical practitioners (Lott, 1995; Rosenthal & Miller, 1982; Woolf, 1991). A number of authors have suggested that rural physicians perceive their opportunities for participation in traditional continuing medical education as inadequate (Lott, 1995; Gill & Game, 1994; Rosenthal & Miller, 1982; Woolf, 1991). As well, Bhatara et al. (1996) have suggested that rural physicians' sense of professional isolation, because of a lack of continuing education opportunities, influences feelings of job dissatisfaction with rural practice.

Nurses in rural communities encounter several barriers to participation in professional development and continuing nursing education programs. Some of these barriers include being far removed from library resources and the long travel distances to meetings of their professional associations. According to Treloar (1985) for many nurses it is very difficult and costly to travel to high quality continuing education programs. This is particularly true in areas where travel may be seasonally restricted due to climatic conditions or where educational resources are sparse or poorly distributed. Rural nurses often find it difficult to travel to distant sites to attend continuing education offerings because staffing and financial constraints restrict the number of nurses that health care agencies can send to outside courses (Clark & Cleveland, 1984).

Pharmacists practising in rural areas also find that access to continuing education opportunities are few and far between. DeMuth (1996) has reported that the major barriers for pharmacists' participation in continuing professional education were related to time constraints, job constraints (such as lack of relief staff), the scheduling and location of group learning, and family commitments. One of the greatest barriers for rural pharmacists was the centralized location of most face-to-face continuing education programs. This was a major problem for practising pharmacists because it required them to travel long distances from their community in order to participate.

Continuing Health Professional Education (CHPE) & Information and Communication Technologies (ICTs)

One of the distinguishing characteristics of a profession is the commitment by its members to the promotion of continued study and lifelong learning (Buchholz, 1979). This commitment is vital to the health professional because with the constant acceleration of change in health sciences information, no amount of formal education, no matter how complete or excellent, can totally prepare him for a lifetime of learning (Herman & Buerki, 1977). Health professionals, regardless of their practice location, require access to effective professional development and continuing education programs.

With the rapid advances which are occurring in the health sciences, it is becoming increasingly challenging for health care professionals to stay abreast of the latest health research information (Whitten, Ford, Davis, Speicher, & Collins, 1998). Knowledge in the health sciences is constantly expanding as new information is published, disseminated, and quickly updated or revised. In this context, the health care practitioner is placed in the unenviable position of having to provide the best health care to the public while trying to use and apply a rapidly changing body of knowledge (Lorenzi, Kues, & Anthony, 1984). For the rural health care provider, gaining access to this timely information is an even greater challenge because of isolation and distance from the larger tertiary care and teaching hospitals where this information exists.

ICTs have been used for supporting the delivery of educational and clinical support to health and medical professionals (Walker et al., 1998). Historically, audio teleconferencing, videoconferencing, slow scan imaging, and videotape programs have been used to deliver continuing health professional education at a distance (Black & Dunikowski, 1985; Dunn et al., 1980; Lindsay et al., 1987; McDowell et al., 1987; Oeffinger et al., 1992; Moore & Hartman, 1992). In recent years, Internet-based technologies have been adopted as a means for delivering information that can be linked to patient care issues in a timely and interactive fashion (Peterson et al., 1999). The use of ICTs in this manner, to bridge the distance of geography and professional isolation, is referred to as 'distance education.'

Distance education occurs when an instructor and adult learner(s) are separated by geography and time, and instruction is mediated through either print, information and/or communication technologies. Distance education delivery modes are distinguished according to the technologies and medium used to carry the learning materials and/or facilitate the two-way communication between participants and instructors. The four main categories of distance learning technologies are audio, video, computer (data), and print. Dating back to the late 1800s and early 1900s, correspondence study appears as the first format which was used for providing educational programming to adult learners residing and studying at a distance from an educational institution or an instructor. Beginning in the 1920s, the means of communication slowly shifted from the medium of print to the mass media of radio. The 1940s and 50s saw another shift in distance education to educational television, and the resulting 'one-to-many' patterns of communication offered by the broadcast technologies.

The next technological breakthrough was around 1970 with the advent of two-way audio systems. Interaction between instructor and the adult learner was now possible. Then, satellite courses, implemented in educational settings during the mid 1970s, using one-way video and two-way audio, allowed for interaction at a verbal level and to some extent at the visual level. In the mid 1980s, the advent of two-way audio and video systems, also known as two-way interactive video systems, revolutionized distance learning and allowed instructors and learners at distant sites to communicate with one another at both a visual and verbal level.

In the 1990s the landscape of the distance education field was transformed yet again. Significant advances in ICTs have enabled the rapid movement of information to almost anywhere in the world. Computer capacities and speeds have advanced to levels previously unimaginable, and present day innovations in multimedia and data compression capabilities are enabling the integration of voice, data, and images over computer networks. Delivery systems that use fiber optics or regular telephone lines are also making use of advanced telecommunication technologies (e.g., Integrated Services Digital Network) and these are revolutionizing the technologies used for delivering distance education programming.

Information and Communication Technologies (ICTs) and the Health Professions

The increased capacities of these ICTs have contributed to a movement away from traditional continuing health professional education (Moore et al., 1994). In Canada, the trend appears to be towards greater use of information and communication technologies in the health care system and in the continuing education of health professionals. ICTs are useful tools for health professionals because they can provide greater access to clinical and health information, continuing health professional education and an enormous range online resources which normally would not be available to them. The availability of these resources is believed to strengthen the communication and networking capabilities of health professionals (Miller et al., 1997; Robinson et al., 1998; Manske et al, 2000). Robinson et al. (1998) report that the advantages of using ICTs include: improved opportunities to find information which meets the specific needs of individuals; improved capabilities to combine various media to meet the learning styles of users; increased access to information and support on demand; and the ability for widespread information dissemination.

Internet and e-mail use has been reported as high among health professionals (Kaczorowski, 2000; Pereira, 2001; Manske et al., 2000). Eighty percent (80%) of health professionals have reported using e-mail (Pereira, 2001; Manske et al., 2000). The Canadian Medical Association (CMA) indicates that in 2001, 83.6% of physicians were using the Internet and 80.6% were using e-mail (CMA, 2001). At least 67% use the Internet for MEDLINE searching and 23% of physicians (21% rural; 24% urban) use the Internet to participate in online CME courses (CMA, 2001). Yung, Foy, and MacCara (2001) surveyed all licensed pharmacists (N = 1,637) within the three Maritime provinces. The majority of respondents (56.2%) used e-mail daily. Some respondents also indicated the weekly collection of disease information (18.8%), therapeutic/treatment information (17.6%), information for patients (17%) and information on new drugs (17%).

While these data suggest that a large number of health professionals are using the Internet, they do not indicate whether the technologies are being used in an appropriate and efficient manner. According to Buckeridge and Goel (2001) the use of informatics or ICTs by Canadian health professionals, and promotion of their use by institutions, is limited. After conducting interviews with

26 leading Canadian health informatics researchers and practitioners, Buckeridge and Goel concluded that health informatics education in Canada is not being integrated into the curriculum as quickly as it is in other G-7 countries. An awareness and understanding of the benefits of using health informatics is one of the major issues challenging the development of health informatics in Canada.

Barriers to Information and Communication Technology (ICT) Adoption and Use

A number of barriers to the use and adoption of ICTs among health professionals and health institutions have been attributed to concerns about security, reliability and the confidentiality of information (Bigsby & Moehr, 1995; Robinson et al., 1998; Leeseberg Stamler et al., 1999; Lacher et al., 2000; Ferguson et al., 2000; Delaney, 2001). Ferguson et al. (2000), for example, report that general practitioners are wary of e-mail for receiving patient discharge summaries or drug information. Also reported as barriers are finding the time necessary to use, and learn how to use, these technologies, as well as the difficulty of locating relevant and useful information on the Internet (Bigsby & Moehr, 1995; Rowe et al., 1995; Lacher et al., 2000; Lawton et al., 2001). Inadequate funding has been reported as another major barrier to the use of ICTs in the health professions (Rowe et al., 1995; Cameron, 1998; Hebert, 2000; Jerant & Lloyd, 2000). Forty nine percent (49%) of respondents in Rowe et al.'s study identified the high cost of computers as a major barrier.

Lack of access to new technologies, rather than a lack of preference for them, has also been identified as a primary barrier in discouraging their use (Mamary & Charles, 2000). Royle et al. (1997) conducted a survey of nursing administrators in hospitals in Central and North West Ontario and found that the larger the hospital the more likely that electronic databases and other information resources were available. Of the 32 respondents who worked in hospitals with less than 100 beds, 90.6% had access to a library, but only 6.2% had access to MEDLINE and 3.1% had access to CINAHL. Manske et al. (2000) also report that a higher percentage of health units serving large versus small populations have greater access to ICT resources, such as e-mail (91% vs. 69%) and the Internet (72% vs. 43%). Health units in smaller regions were less likely to have the infrastructure in place to use the technology (Manske et al., 2000).

The level of comfort, experience and skill which health professionals have with ICTs are also important factors influencing adoption and usage. Rowe et al. (1995) surveyed first-year family medicine residents from Canadian university-affiliated programs and found that only 13% reported being very or extremely comfortable with computers; while 29% reported being somewhat comfortable and 24% not at all comfortable. They also found that 30% of Canadian family medicine residents felt they were not exposed to enough computer training during their education. Five years later, Jerant and Lloyd (2000) again identified lack of suitable training as a barrier to computer use.

Enhancing Information and Communication Technology (ICT) Adoption and Use

It is believed that the benefits of the adoption and usage of ICTs have not been realized because individuals and organizations are unable to use these resources to their full capabilities (Hebert, 2000). According to Moehr and Grant (2000) Canadian health professionals and students need a basic knowledge of the capabilities and limitations of information systems. Saranto and Leino-Kilpi (1997) report that nurses need to know how to access and use hospital/management information systems, including those which address clinical and patient care. Staggers, Gassert, and Curran (2001) have identified competencies for both the beginning and experienced nurse. Beginning nurses should possess basic information management and computer technology skills, while experienced nurses should be highly skilled in these areas.

Many family physicians now identify 'improving computer skills' as a core CME area more frequently than most clinical areas (McClaran et al., 2000). Cameron (1998) has suggested that the informatics skills required by Canadian physicians should include an ability to use various word processing and presentation software, Internet and e-mail, Internet databases, and office management systems. Other medical informatic areas include: knowledge of computer-based information sources for patient care; knowledge of electronic medical records (EMR); office-based and hospital-based management systems; and an increased knowledge of computer-based continuing medical education, telecommunications and telemedicine (Lacher et al., 2000; Candy, 2000).

Like other health professionals, pharmacists do not need to become informatics specialists, but they need to understand how informatics works (Felkey & Barker, 1995). Balen, Miller, and Malyuk (2000) suggest that the informatics skills for pharmacists need to include the use of computers to collect, store, retrieve and send drug and patient related data for both administrative and clinical purposes. Pharmacists also require knowledge of personal and network computing; hospital information systems; personal digital assistants; the Internet; word processing; and presentation, statistical analysis, and database management software. However, Balen et al. (2000) believe that students are not necessarily receiving the instruction they require as pharmacy has not taken the lead in developing informatics which meets the profession's needs.

The literature identifies a number of strategies and methodologies which can be used to introduce

ICTs into health professional education. Carty and Rosenfeld (1998) have identified a number of criteria related to how nursing education programs could achieve technological excellence. Their criteria includes: providing students and faculty with adequate access to computers; making informatics courses available; and providing the necessary infrastructure (ie. technical support, computer labs, Internet and e-mail access, allocation of financial and personnel resources, etc.). Other authors discuss the development of specific programs or workshops designed to improve the ICT skills of health professionals. From 1996 to 1997 three rural Northwest Ohio hospitals, along with the state's Medical college, co-sponsored sessions which addressed the medical application of computers for rural physicians (Hartmann, 1998). Program topics included medical databases, medical CD-ROMS, the Internet and e-mail. Allan et al. (2000) discuss a series of workshops which were held for physicians related to computer basics, introduction to computers in medicine, introduction to the Internet and computer-aided learning (CAL) and information retrieval. Through follow-up surveys they discovered that more physicians reported increased use of computers as a result of participation in the workshops (Allan et al., 2000).

Patel & Arocha (2000) describe a meeting held among a group of scholars from the fields of cognitive science, medicine, ethics, medical technologies and intelligent tutoring systems to explore issues relevant to the education of the health professions in an information age. One of the research agendas suggested for future development was information technology-related research (Patel & Arocha, 2000). According to this agenda, there were a number of important questions which needed to be examined. Who uses information technologies in health care settings and how? Are such technologies integrated into clinical practice? Are they being used successfully? According to the scholars participating in this meeting, there was a need for improved studies of how best to educate health professionals for the challenging practice environment of the future (Patel & Arocha, 2000).

In 1999, a Health Canada report entitled 'Canada Health Info*way*: Paths to Better Health' was prepared by the Advisory Council on Health Infostructure for the Office of Health and the Information Highway. According to the Council's report, health care was an information and communication-intensive activity and as a result most health care professionals needed training in how to use these new ICTs. A number of recommendations concerning the need for health professional training to adopt and apply information systems in their work were suggested:

> *Recommendation 3.2*
> Federal, provincial and territorial governments, in collaboration with associations representing health care professionals and providers, should provide funding for: (a)

> professional education and development opportunities for health care professionals and providers across the spectrum of health care to acquire the skills needed for optimal use of health information and communications systems.
>
> *Recommendation 3.7 (d)*
> Support training for health care professionals and providers so that they can fully exploit the potential of telehealth (Health Canada, 1999).

The report went on to suggest that governments, in collaboration with associations of health care professionals, should also fund training to help these groups acquire the necessary digital skills, as well as to participate in developing, piloting and evaluating tools to support clinical decision making. Further, in the Council's view, it was also prudent to put in place a labour force strategy to address the impact of these changes upon health care professionals, providers and workers, and to make sure that the necessary skills and knowledge were in place.

Study Purpose

The purpose of this study was twofold. First, the project team was interested in identifying the extent and level of ICT usage among Canadian CHPE providers. Second, they were also interested in assessing the type and nature of ICT training and educational programming which is being provided by Canadian CHPE providers. CHPE was defined as continuing health professional educational courses and/or programs which are directed to a health practitioner audience. For purposes of this project, these programs may or may not be approved for continuing education credit as required by a licensure board, professional organization, or the workplace to maintain competence, retain licensure, certification, and/or employment.

A national questionnaire-survey of CHPE providers was conducted to identify the type of ICTs being used to deliver CHPE; to identify 'best practices' pertaining to the planning, development, delivery and evaluation of distance learning programs for CHPE; and to identify programs and/or services which have been established to provide CHPE on the use, adoption, integration, and application of ICTs among health professional groups. The CHPE provider audience included academic respondents (schools of Medicine, Nursing and Pharmacy), national/provincial health professional associations and non-governmental organizations, pharmaceutical industry, and hospital/health care authority organizational respondents.

In Canada, there is a trend towards greater usage of ICTs in the health care system and in the continuing education of health professionals. Canada faces unique difficulties in delivering health care, particularly among its many rural and remote communities. Telehealth applications have been shown to be effective in enabling teleconsultations, supporting rural and remote health professionals in the provision of care, decreasing the costs of health care delivery, and providing greater access to health care services for geographically isolated populations. Some of the main barriers to the adoption, integration and usage of these applications among health professionals have included negative attitudes, lack of awareness and understanding of the technologies and particular applications, and lack of knowledge and skills in ICT usage. ICTs have been used for many years to provide CHPE to rural and remote health professionals and as a result have addressed recruitment and retention challenges, allowed for the maintenance of competencies among rural health care providers, and enhanced the quality of care provided to rural and remote communities. A greater understanding of efforts to educate health professionals in the integration and usage of ICTs in their practices, as well as a better understanding of how Canadian CHPE providers are applying best practices in their use of ICTs to deliver continuing education, will contribute to effective decision-making and policy-making that impacts the health and health care of all Canadians.

Methodology

A questionnaire-survey was designed by the research team to collect information on the extent to which information and communication technologies (ICTs) have been adopted by continuing health professional education (CHPE) providers in Canada. Information about existing programming initiatives to enhance the knowledge, skills and attitudes of health professionals towards the adoption and use of ICT's in their professional work was also collected from the survey respondents. The survey was validated by an advisory committee comprising national experts in the field of continuing professional education and information and communication technology usage. These individuals reviewed several drafts of the questionnaire-survey and were consulted on the composition of the respondent population for the study. A draft of the questionnaire-survey was piloted with several health professional educators and these individuals were asked to critically review the survey and provide feedback on the readability and clarity of the questionnaire items. Finally, two epidemiologists reviewed formatting aspects of the survey and survey items. A final version of the survey and accompanying cover letters were submitted to the Human Investigation Committee, Faculty of Medicine, Memorial University and full ethical approval was received in August 2002.

A total of N = 3,044 surveys were distributed to a variety of CHPE providers in Canada between September and December 2002. If the names of the appropriate contacts were known, surveys were directed towards specific individuals (ie. Dean, Director, Manager) or departments (ie. CME, Professional Development, Human Resources). Six hundred and seventy-seven (N = 677) surveys were returned (the return and response rates per CHPE provider category are presented in the "Results" section). The following CHPE providers were included in the survey population:

- One hundred and thirty five (N = 135) School of Nursing respondents were forwarded the questionnaire-survey for completion. This organizational respondent category encompassed all accredited schools of nursing in Canada. The address list was compiled from an Internet search and the Canadian Association of Schools of Nursing (CASN) Website (http://www.causn.org). It was compared and validated against the nursing education programs listed on the Canadian Nurses Association (CNA) Website (http://www.cna-nurses.ca).

- Sixteen (N = 16) School of Medicine respondents, which included CME Deans, Associate Deans, or Directors, were forwarded the survey. This group included all accredited School of Medicine respondents in Canada. The list was compiled and validated from the Association of Canadian Medical Colleges (ACMC) Website (http://www.acmc.ca).

- Nine (N = 9) School of Pharmacy respondents were forwarded the questionnaire-survey. This group included all accredited School of Pharmacy respondents in Canada. The address list was compiled from an Internet search and was compared and validated against the programs listed on the Canadian Pharmacists Association (CPhA) Website (http://www.cdnpharm.ca).

- One hundred and one (N = 101) National/Provincial Health Professional Associations were forwarded the questionnaire-survey. This organizational respondent category included national and provincial professional associations for nursing, medicine, and pharmacy practitioners and professional societies representing medical specialities. This category also included non-profit health organizations which address the diverse health issues of the Canadian population, such as the Canadian Diabetes Association and the Canadian Mental Health Association. The listing of respondents for this organizational category was compiled by an Internet search and through a mailing address list prepared by the Canadian Healthcare Association (CHA) (http://www.canadian-healthcare.org/publishing.htm).

- Fifty-six (N = 56) pharmaceutical industry organizational respondents (Directors) were forwarded the survey. This group was compiled from the listing of Canada's Research-Based Pharmaceutical Companies (Rx&D) on the Rx&D Website (http://www.canadapharma.org).

- Hospital/Health Care Management Boards comprised the final organizational category which was included in the survey respondent population. This organizational category was comprised of N = 2727 potential respondents and included hospitals, regional district health authorities and boards, retirement, nursing, and long-term care facilities, and various health centres (e.g. rehabilitation, children, mental health, etc.). If possible, surveys were directed towards each organization's CEO/Director or a specific department such as Human Resources, Communications, Information Services/Technology, or Staff Development. The address listings for this category were compiled through the Canadian Healthcare Association.

A number of methods were used in an attempt to increase the survey response rate. First, a cover letter was included with each survey which detailed the study's purpose and the deadline for submission. After the first submission deadline had passed, a second copy of the survey was mailed to non-respondents. Included with this survey was a follow-up letter and a new submission deadline. After the second deadline had passed, reminder letters (without copies of the survey) were sent to a stratified sample of non-respondents (N = 965). The stratified sample included non-respondents from each province and territory, as well as each CHPE provider category. In most cases, there was a period of three to four weeks between respondents' receipt of the survey/reminder letter and the submission deadline. The survey was also made available for download in .pdf file format from the Office of Professional Development's website (http://www.med.mun.ca/pdmed).

The questionnaire survey items were developed from a review of relevant and available literature. A number of the survey items were adapted and modified with permission from the American Association of Colleges of Nursing (AACN) Technology Survey (AACN, 1999). The questionnaire-survey included items which were designed to collect information in the following areas:

- the type of organization to which respondents belonged;
- the organization's commitment to the provision of continuing professional education programming by technology-based distance education programming;
- experience in technology-based distance education delivery to health professionals;
- factors influencing decision to offer technology-based distance education;
- source(s) of support for technology-based distance education program delivery and access to internal resources to support distance education program development and delivery;
- type(s) and nature of partnerships formed for the purpose of sharing resources for technology-based distance education program development and delivery;
- type(s) of technologies used in delivering distance education programs to health professionals;
- type(s) of faculty development provided to support instructors and faculty in distance education program development and delivery;
- composition of target audience/participants in distance education programs;

- factors influencing likelihood of use of information and communication technologies for technology-based continuing professional education;

- types of continuing professional education programs offered in the areas of information and communication technologies.

The questions concerning 'factors' influencing the likelihood of ICT usage in CHPE delivery were adopted and modified from the work of Collis, Peters, and Pals (2000). According to Collis et al. (2000) telematic applications are not being used regularly as instructional tools in educational settings. In their work, Collis and colleagues developed a model for predicting an individual's likelihood of using a telematics application in teaching practices. The '4-E Model' hypothesises that the likelihood of using a telematics application in teaching practices can be expressed as the sum of four factors: 'environmental aspects' in the institution in which one works; 'educational effectiveness' or perceived educational payoff; 'ease of use' or level of difficulty in making use of the application; and 'personal engagement' or subjective personal interest in the application. According to the 4-E Model, when the sum of these factors approaches a certain threshold, usage is likely to occur, otherwise not.

Items comprising the three scales of 'organizational' and 'professional influences' and 'strengths and resources' were adopted and modified from Collis et al. (2000) 4-E Model questionnaire. Table 1 lists the items included within each of these scales. The organizational influences scale encompasses items which are intended to measure the influence of organizational factors on the likelihood of information and communication technology adoption in continuing professional education delivery. Each item (N = 7) is responded to via a five-point scale, where the most negative option is coded as having a value "1" and the most positive option is coded as having a value "5". The professional influences scale comprises items (N = 6) which are intended to measure the influence of professional factors. These include items such as: 'My peers and colleagues believe the Internet is an important tool', 'In the professional field in which I work, many people are Internet users', 'In the professional field in which I work, most people think that technology-based distance education is important', 'Soon everyone will be using the Internet', 'Distance learning is likely to contribute to the solution of learning-related problems relevant to the professional field in which I work', 'It is my personal opinion that technology-based distance education will improve teaching and learning.' Response possibilities are: Strongly Disagree = 1, Disagree = 2, I can't say = 3, Agree = 4, Strongly Agree = 5.

Table 1 **Survey Scales for Factors Influencing ICT Adoption & Usage**

Organizational Influences
• The vision within my organization for technology-based distance education is.. • The support from the leaders in my organization for technology-based distance education is.. • The readiness to change among the people in my organization when it comes to the use of technology-based distance education is.. • The adequacy of my organization's technical infrastructure for technology-based distance education is.. • The day-to-day support of technology-based distance education in my organization is.. • The funding and incentives for technology-based distance education that are available in my organization are.. • The experiences in the past that my organization has had with technology-based distance education have been..
Professional Influences
• My peers and colleagues believe the Internet is an important tool. • In the professional field in which I work, many people are Internet users. • In the professional field in which I work, most people think that technology-based distance education is important. • Soon everyone will be using the Internet. • Distance learning is likely to contribute to the solution of learning-related problems relevant to the professional field in which I work. • It is my personal opinion that technology-based distance education will improve teaching and learning.
Strengths & Resources
• A priority of my unit. • A priority of my organization. • Administration supportive of the idea. • Sufficient administrative/clerical support staff.

- Specialized staff to design the courses.
- Experience in technology-based distance education.
- Adequate budget for technology-based distance education programs.
- Telecommunication costs are reasonable.
- Adequate telecommunication infrastructure (eg. bandwidth availability)
- Adequate facilities/equipment for supporting distance education development and delivery.
- Adequate faculty/subject matter expert support.
- Convenient personal Internet access among target audience.
- Convenient personal computer access among target audience.
- Adequate level of computer experience among target audience.
- Enthusiasm among target audience.
- Organizational support from employers of target audience.
- Sufficient time commitment for participation among target audience.

The range (minimum to maximum) of sum scores which respondents could have received for each scale were as follows: organizational influences, range of 7 to 35; professional influences, range of 6 to 30; strengths and resources, range of 17 to 85. According to Collis et al. (2000) each factor's sum, or vector sum as they call it, can be either positive or negative. When the positive vector is large enough so that the vector approaches a threshold level described as a "likelihood-of-use" line, an individual is likely to use a telematics application in his/her teaching and learning (Collis et al., 2000). Therefore, using the 4-E Model as a template, an analysis of the sums of respondents' scores for the scales of organizational and professional influences, and strengths and resources were hypothesized as being indicative of when information and communication technology adoption and usage is likely to occur.

Surveys were coded and analyzed using the Statistical Package for the Social Science (SPSS 11.0 for Windows). Methods of analysis included: cross-tabulation analyses to determine and compare the responses of organizational category respondents to individual survey items; and Mann-Whitney and Kruskal-Wallis tests to analyze the differences and relationships between organizational, professional, and strengths and resources factors and the actual reported usage of information and communication technologies by the organizational respondents.

This project report provides a large amount of survey data and information, much of which is presented in table format. To facilitate reading of the report, discussion of the findings is found in the text accompanying the tables. Discussion of the major findings and conclusions from the study follow the presentation of the results. The results of this survey provide a national overview of the use of ICTs for CHPE delivery. The results also provide a national summary of CHPE programs which are being offered by CHPE providers to develop the ICT-related knowledge, skills, and attitudes of health professionals. The results provide important information for future policy and decision-making related to the effective use of ICTs in CHPE delivery. The findings also provide a better understanding of the type and nature of CHPE programs which are being offered to enhance ICT-related skills among the health professions.

Results

Table 2 and Figure 1 present the results pertaining to the response rate for each CHPE provider category. School of Medicine and School of Pharmacy organizational respondents provided the highest response rates, 62.5% and 55.6% respectively; surveys were received from 10 of 16 schools of medicine and 5 of 9 schools of pharmacy. Fifty-eight (N=58) of 135 School of Nursing questionnaire-surveys were returned for a response rate of 43.0%. Forty-seven (N=47) of 101 surveys were completed by organizations comprising the National/Provincial Health Professional Associations category, for a response rate of 46.5%. The response rates for the Pharmaceutical Industry and the Hospital/Health Care Management Board organizational categories were less than expected. Only 15 of 56 pharmaceutical industry organizational respondents completed and returned the survey, for a response rate of 26.8%. The lowest response rate (19.9%) was received from Hospital/Health Care Management Board organizational respondents. Only 542 of 2,727 potential respondents completed and returned the survey.

Table 2 Summary of Potential/Actual Respondents and Response Rate

Type of Organization	# of Potential Respondents	# of Actual Respondents	Response Rate
School of Nursing	135	58	43.0%
School of Medicine	16	10	62.5%
School of Pharmacy	9	5	55.6%
National/Provincial Health Professional Association	101	47	46.5%
Pharmaceutical Industry	56	15	26.8%
Hospital/Health Care Management Board	2727	542	19.9%
TOTAL	3044	677	

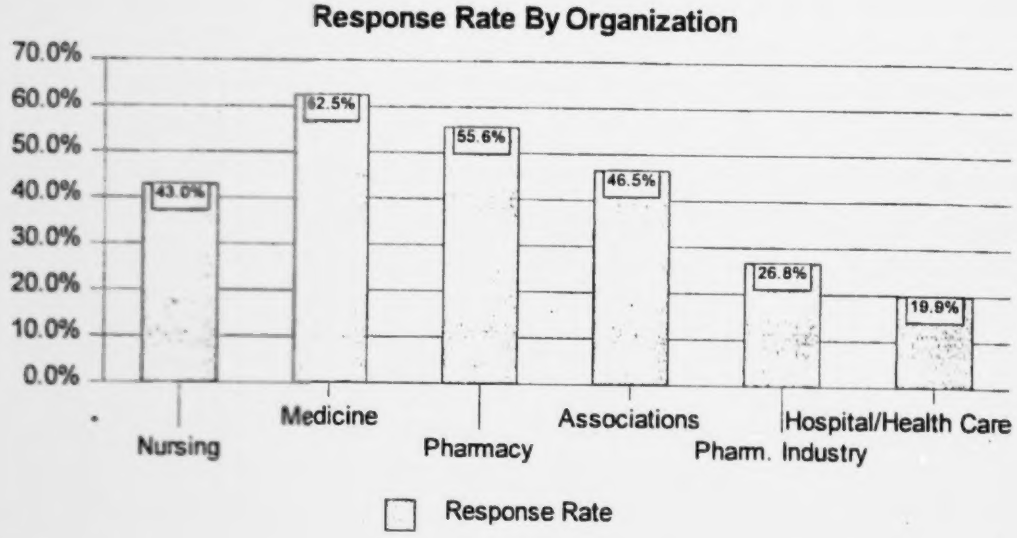

Figure 1

Table 3 presents the results pertaining to the provision of technology-based distance education programming among the survey respondents. The majority of School of Nursing (55.2%) and School of Medicine (70.0%) organizational respondents reported that they provide technology-based distance education programming to health professionals. The majority of School of Pharmacy respondents (80.0%) reported that they were not providing distance CHPE programming. As well, the majority of national/provincial health professional associations (65.2%), pharmaceutical industry respondents (73.3%), and hospital/health care management boards (78.9%) indicated that they were not providing distance CHPE programming. Overall, 74.2% of survey respondents indicated that they were not providing technology-based distance education programming to address the continuing professional education needs of health care practitioners. Figures 2 through 6 present pie charts representing the organizational respondent categories and their reports of technology-based distance education program delivery.

Table 3 **Summary of Providers of Technology-based Distance Education Programming to Health Professionals**

Type of Organization	Yes		No		TOTAL
	N	%	N	%	
School of Nursing	32	55.2%	26	44.8%	58
School of Medicine	7	70.0%	3	30.0%	10
School of Pharmacy	1	20.0%	4	80.0%	5
National/Provincial Health Professional Association	16	34.8%	30	65.2%	46
Pharmaceutical Industry	4	26.7%	11	73.3%	15
Hospital/Health Care Management Board	114	21.1%	426	78.9%	540
TOTAL	174		500		674

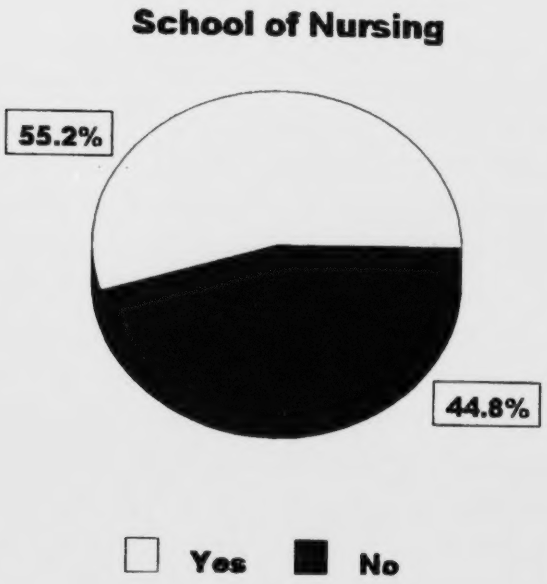

Figure 2

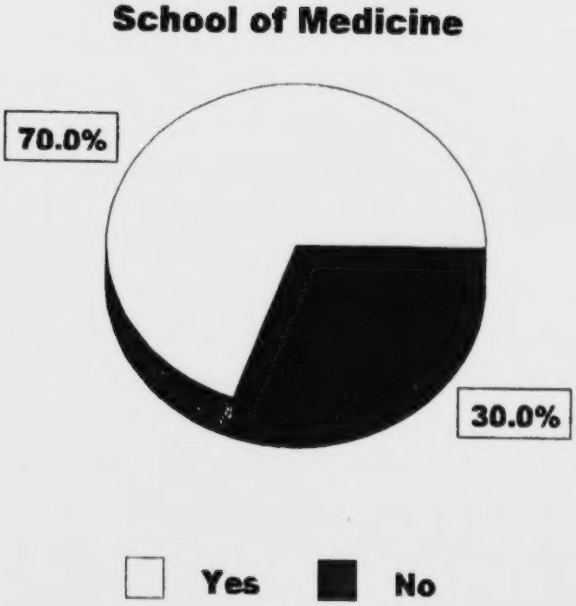

Figure 3

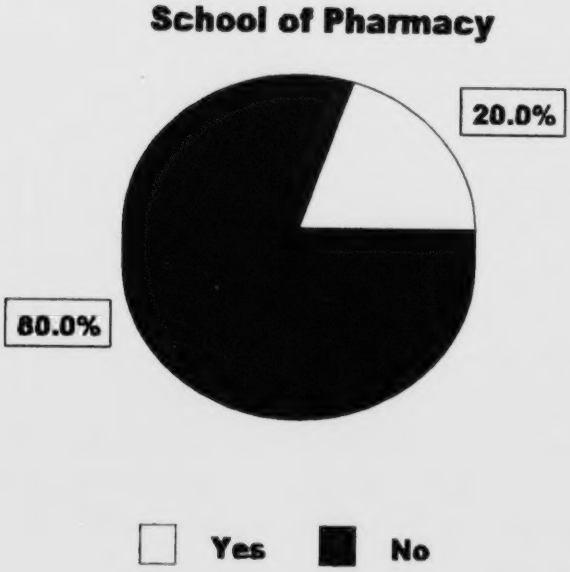

Figure 4

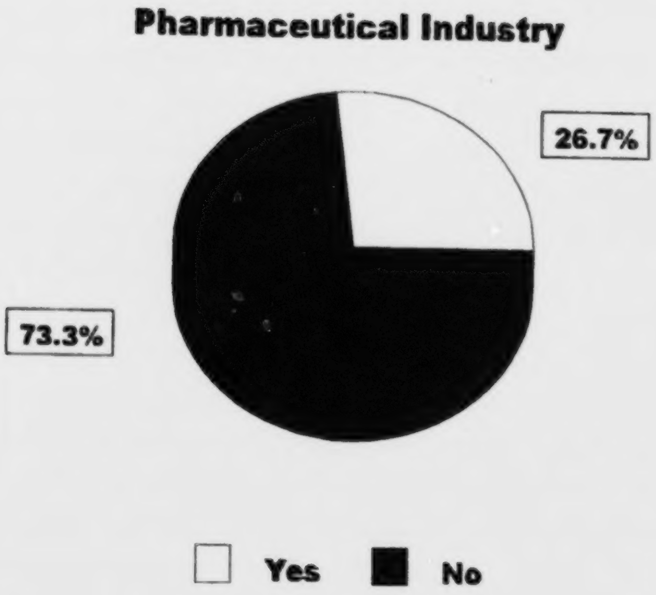

Figure 5

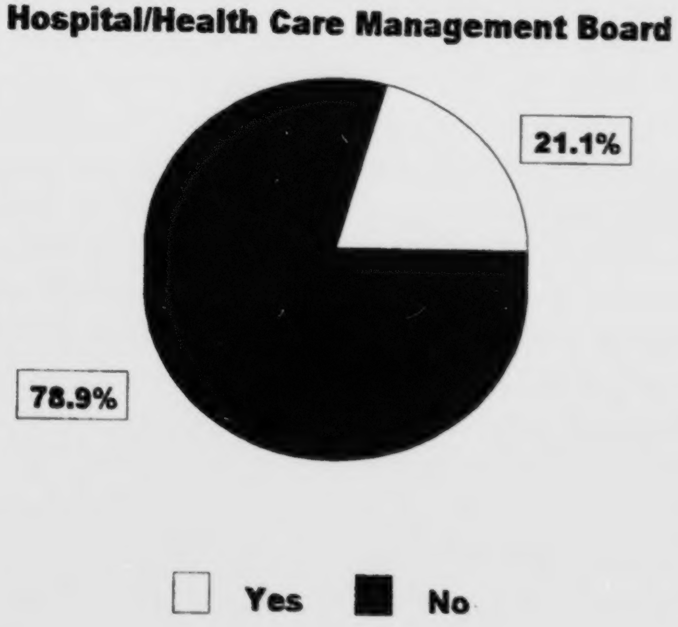

Figure 6

Table 4 provides the results pertaining to the number of years that respondents have been offering CHPE programming via technology-based distance education. These results only reflect the responses of those organizations who had indicated that they were providing technology-based distance education programming to health professionals. The results indicate that Schools of Nursing and Medicine . reported the greatest level of experience in the delivery of continuing professional education programming by technology-based distance education. The majority of School of Nursing respondents (59.4%) reported that they had been offering distance education programs for six years or greater. Forty-three percent (42.9%) of School of Medicine respondents indicated that they had been offering continuing professional education programs by distance education for six years or greater. Thirty-one percent (31.3%) of national/provincial associations reported offering continuing professional education programming by technology-based distance education for six years or greater, and 19.3% of hospital/health care management organizational respondents indicated that they had been offering programs by distance education for six years or more. The pharmaceutical industry respondents reported the least experience in CHPE delivery by technology-based distance education. Only two (N = 2) respondents reported between one and five years of experience. The majority of hospital/health care management board respondents (58.8%) indicated that they had been offering CHPE programming by technology-based distance education between one and five years.

Table 5 presents the results pertaining to respondents' reports of factors which had influenced organizational decision-making in the area of technology-based distance education program delivery. These results only reflect the responses of those organizations who had indicated that they were providing technology-based distance education programming to health professionals. The results indicate a consistent level of responses across the organizational respondent categories. The majority of School of Nursing respondents reported that the factors which had the greatest influence on their decision to offer technology-based distance education included 'addressing CHPE needs of rural/remote health professionals' (78.8%), 'increasing opportunities for flexible CHPE access' (70.6%), and it was 'part of the organization's mission' (53.1%). The majority of School of Medicine respondents also indicated similar factors including 'addressing CHPE needs of rural/remote health professionals' (85.7%), 'increasing opportunities for flexible CHPE access' (71.4%), and it was 'part of the organization's mission' (57.1%).

Interestingly, only a minority of respondents across the organizational categories indicated that 'increasing revenue' was a factor which influenced the decision to offer technology-based distance education. As well, only a minority of the academic organizational respondents indicated that 'less expensive delivery modality' was a significant factor which had influenced their decision to offer technology-based distance education. Only 15.6% of School of Nursing respondents and 14.3% of

School of Medicine respondents reported that this factor had influenced their decision to offer distance education. However, a majority of hospital/health care management board organizational respondents indicated that 'less expensive delivery modality' was a significant factor which influenced their decision to offer continuing professional education by technology-based distance education (60.5%). As well, hospital/health care management board respondents also reported that 'addressing mandatory CE needs of health professionals' was an important factor (43.0%). This result was considerably higher than other scores. Respondents were also provided with an option to identify 'other' factors which may have influenced their organization's decision to offer technology-based distance education. The 'availability of funding' (N = 5) and 'being able to research the effectiveness of the technology' (N = 1) were other factors identified by the respondents.

Table 4 Summary of Years of Experience in Offering Technology-based Distance Education Programming

Type of Organization	Number of Years												TOTAL
	< 1		1 - 5 years		6 - 10 years		11 - 15 years		16 - 20 years		> 20 years		
	N	%	N	%	N	%	N	%	N	%	N	%	
School of Nursing	2	6.3%	11	34.4%	5	15.6%	5	15.6%	6	18.8%	3	9.4%	32
School of Medicine	2	28.6%	2	28.6%	1	14.3%	1	14.3%	0	0.0%	1	14.3%	7
School of Pharmacy	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100%	1
National/Provincial Health Professional Association	4	25.0%	7	43.8%	3	18.8%	1	6.3%	0	0.0%	1	6.3%	16
Pharmaceutical Industry	2	50.0%	2	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	4
Hospital/Health Care Management Board	25	21.9%	67	58.8%	13	11.4%	4	3.5%	4	3.5%	1	0.9%	114
TOTAL	35		89		22		11		10		7		174

Table 5 **Factors Influencing Organizational Decision to offer Technology-based Distance Education Programming**

Organizations		Part of organization's mission		Increase revenue		Address CHPE needs of rural/ remote health professionals		Increase opportunity for CHPE access		Address mandatory CE needs		Less expensive CHPE modality		Don't know	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
School of Nursing	Yes	17	53.1%	7	21.2%	26	78.8%	24	70.6%	5	15.6%	5	15.6%	0	0.0%
	No	15	46.9%	26	78.8%	7	21.2%	10	29.4%	27	8.4%	27	8.4%	32	100%
School of Medicine	Yes	4	57.1%	1	14.3%	6	85.7%	5	71.4%	2	28.6%	1	14.3%	0	0.0%
	No	3	42.9%	6	85.7%	1	14.3%	2	28.6%	5	71.4%	6	85.7%	7	100%
School of Pharmacy	Yes	0	0.0%	0	0.0%	1	100%	1	100%	1	100%	0	0.0%	0	0.0%
	No	1	100%	1	100%	0	0.0%	0	0.0%	0	0.0%	1	100%	1	100%
National/Prov. Health Professional Association	Yes	5	31.3%	1	6.3%	14	87.5%	16	94.1%	5	31.3%	8	50.0%	0	0.0%
	No	11	68.8%	15	93.8%	2	12.5%	1	5.9%	11	68.8%	8	50.0%	16	100%
Pharm. Industry	Yes	2	50.0%	0	0.0%	2	50.0%	4	100%	1	25.0%	2	50.0%	0	0.0%
	No	2	50.0%	4	100%	2	50.0%	0	0.0%	3	75.0%	2	50.0%	4	100%

Hospital/ Health Care	Yes	49	43.0%	6	5.3%	70	61.4%	66	57.4%	49	43.0%	69	60.5%	3	2.6%
Management Board	No	65	57.0%	108	94.7%	44	38.6%	49	42.6%	65	57.0%	45	39.5%	111	97.4%
TOTAL		174		175		175		178		174		174		174	

Table 6 presents the results pertaining to respondents' reports of sources of support for continuing professional education by technology-based distance education programming. These results only reflect the responses of those organizations who had indicated that they were providing technology-based distance education programming to health professionals. The majority of School of Nursing respondents reported that 'tuition/registration fees' (78.1%) and 'provincial government grants' (50.0%) were main sources of support for their distance education programming. Seventy one percent (71.4%) of School of Medicine respondents reported that 'industry educational grants' were a main source of support for their distance education programs, while 57.1% also indicated that 'tuition/registration fees' were a source of support. National/provincial health professional association respondents indicated that the main sources of support for their distance education program offerings were from 'provincial government grants' (37.5%), 'industry educational grants' (37.5%), and 'tuition/registration fees' (37.5%). Forty-five percent (45.0%) of hospital/health care management board organizational respondents reported that a main source of support for their distance education programming was from a 'parent institution grant/subsidy', while 31.6% reported support from 'provincial government grants', and 24.6% indicated support from 'tuition/registration fees'. Respondents were also provided with an option to identify any other sources of support for continuing professional education by technology-based distance education programming. 'Bursary programs' (N =1), 'membership of a telehealth organization or network' (N =2), and 'research funding support' (N = 1) were identified as other sources of support.

Table 7 presents the results pertaining to the relationship between the responding organizational unit and its parent institution regarding distance education. As an example, within academic institutions, responsibility for continuing professional education program organization and management may be based within a unit which is separate and distinct from a distance education unit which is responsible for development and delivery of undergraduate and graduate level distance education courses. The responses to this item only reflect those organizations who had reported that they were providing technology-based distance education programming to health professionals. A majority of the academic organizational respondents (Nursing and Medicine) reported that their parent organization offered distance education courses and that they had access to distance education resources within the parent institution. Seventy-eight percent (78.0%) of School of Nursing and 100% of School of Medicine respondents indicated that their parent institution offered distance education courses. Seventy-eight percent (78.1%) of School of Nursing and 71.4% of School of Medicine respondents also reported that they had access to distance education resources within their parent institution.

Table 6 Sources of Support for Technology-based Distance Education Programming

Organizations		Foundation/ philanthropic grant		Federal Gov. grant		Provincial Gov. grant		Professional association grant/ subsidy		Industry educational grant		Parent institution grant/ sub.		Tuition/ registration fees		Alumni donation		Don't know	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
School of Nursing	Yes	1	3.1%	1	3.1%	16	50.0%	1	3.1%	1	3.1%	11	32.4%	25	78.1%	1	3.0%	2	6.3%
	No	31	96.9%	31	96.9%	16	50.0%	31	96.9%	31	96.9%	23	67.6%	7	21.9%	32	97.0%	30	93.8%
School of Medicine	Yes	0	0.0%	1	14.3%	1	14.3%	2	28.6%	5	71.4%	1	14.3%	4	57.1%	2	28.6%	0	0.0%
	No	7	100%	6	85.7%	6	85.7%	5	71.4%	2	28.6%	6	85.7%	3	42.9%	5	71.4%	7	100%
School of Pharmacy	Yes	0	0.0%	0	0.0%	0	0.0%	1	100%	1	100%	0	0.0%	1	100%	0	0.0%	0	0.0%
	No	1	100%	1	100%	1	100%	0	0.0%	0	0.0%	1	100%	0	0.0%	1	100%	1	100%
Health Prof. Association	Yes	1	6.3%	1	6.3%	6	37.5%	3	18.8%	6	37.5%	4	23.5%	6	37.5%	0	0.0%	1	6.3%
	No	15	93.8%	15	93.8%	10	62.5%	13	81.3%	10	62.5%	13	76.5%	10	62.5%	16	100%	15	93.8%
Pharm. Industry	Yes	0	0.0%	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%	2	66.7%	0	0.0%	0	0.0%
	No	3	100%	3	100%	1	33.3%	3	100%	3	100%	3	100%	1	33.3%	3	100%	3	100%
Hospital/ Health Care Management Board	Yes	7	6.1%	11	9.6%	36	31.6%	9	7.9%	5	4.4%	68	45.0%	28	24.6%	1	0.9%	8	7.0%
	No	107	93.9%	103	90.4%	78	68.4%	105	92.1%	109	95.6%	83	55.0%	86	75.4%	113	99.1%	106	93.0%
TOTAL		173		173		173		173		173		213		173		174		173	

Table 7 Summary of Relationship Between Organizational Respondent and Parent Institution

Type of Organization	Parent Institution Offers Distance Education Courses						Total	Access to Distance Education Resources Within Parent Institution						Total
	Yes		No		N/A			Yes		No		N/A		
	N	%	N	%	N	%		N	%	N	%	N	%	
School of Nursing	25	78.0%	1	3.1%	6	18.8%	32	25	78.1%	3	9.4%	4	12.5%	32
School of Medicine	7	100%	0	0.0%	0	0.0%	7	5	71.4%	2	28.6%	0	0.0%	7
School of Pharmacy	1	100%	0	0.0%	0	0.0%	1	1	100%	0	0.0%	0	0.0%	1
National/Provincial Health Professional Association	3	20.0%	4	26.7%	8	53.3%	15	1	6.7%	8	53.3%	6	40.0%	15
Pharmaceutical Industry	4	100%	0	0.0%	0	0.0%	4	4	100%	0	0.0%	0	0.0%	4
Hospital/Health Care Management Board	41	38.0%	33	30.6%	34	31.5%	108	41	37.3%	34	30.9%	35	31.8%	110
TOTAL	81		38		48		167	77		47		45		169

Table 8 presents the results pertaining to respondent's report of partnerships. These results only reflect the responses of those organizations who had indicated that they were providing technology-based distance education programming to health professionals. The majority of respondents from the organizational categories of schools of nursing, schools of medicine and hospital/health care management boards reported that they had formed partnerships for the purpose of sharing financial, human and/or technical resources. Sixty-two percent (62.5%) of School of Nursing respondents, 85.7% of School of Medicine respondents, and 67.9% of hospital/health care management board respondents indicated that they had formed partnerships.

Table 8 Summary of Partnering Relationships

Type of Organization	Yes		No		TOTAL
	N	%	N	%	
School of Nursing	20	62.5%	12	37.5%	32
School of Medicine	6	85.7%	1	14.3%	7
School of Pharmacy	1	100%	0	0.0%	1
National/Provincial Health Professional Association	6	42.9%	8	57.1%	14
Pharmaceutical Industry	3	75.0%	1	25.0%	4
Hospital/Health Care Management Board	74	67.9%	35	32.1%	109
TOTAL	110		57		167

Table 9 provides the results pertaining to the types of partnerships which organizational respondents reported that they had formed. The responses to this item only reflect those organizations who had reported that they were providing technology-based distance education programming to health professionals. Across organizational categories, the most significant type of partnership was that which was formed with other educational institutions. Fifty-nine percent of schools of nursing (59.1%), 66.7% of School of Medicine respondents, 66.7% of health professional association respondents, and 67.1% of hospital/health care management board respondents indicated that partnerships with other educational institutions was a major type of partnership. Partnerships with other departments in the parent institution was also a major type of partnership across organizational categories. Sixty-three (63.6%) of schools of nursing and 75.0% of pharmaceutical industry respondents indicated that partnerships with other departments in their parent institution was a major type of partnership.

However, only 33.3% of Schools of Medicine indicated this type of partnership. A majority of health professional association respondents reported that partnerships with business/industry (83.3%) and professional associations/societies (50.0%) were also important. Partnerships with provincial and federal government organizations and community-based agencies were not identified as significant partnership types by the majority of respondents nor across the organizational respondent categories. Respondents were also invited to identify any other partnership types. Partnerships with health regions/authorities (N = 5) and telehealth networks/projects (N = 2) were reported.

Table 9 Types of Partnerships Formed by Organizational Respondents

Organizations		Other department(s) in parent institution		Other educational institution(s)		With business industry		With professional associations/ societies		With Provincial Government		With Federal Government		With community-based agencies	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
School of Nursing	Yes	14	63.6%	13	59.1%	5	22.7%	4	18.2%	5	22.7%	0	0.0%	1	4.5%
	No	8	36.4%	9	40.9%	17	77.3%	18	81.8%	17	77.3%	22	100%	21	95.5%
School of Medicine	Yes	2	33.3%	4	66.7%	2	33.3%	2	33.3%	1	16.7%	1	16.7%	0	0.0%
	No	4	66.7%	2	33.3%	4	66.7%	4	66.7%	5	83.3%	5	83.3%	6	100%
School of Pharmacy	Yes	1	100%	0	0.0%	0	0.0%	1	100%	0	0.0%	0	0.0%	0	0.0%
	No	0	0.0%	1	100%	1	100%	0	0.0%	1	100%	1	100%	1	100%
Health Professional Association	Yes	3	50.0%	4	66.7%	5	83.3%	3	50.0%	2	33.3%	0	0.0%	3	50.0%
	No	3	50.0%	2	33.3%	1	16.7%	3	50.0%	4	66.7%	6	100%	3	50.0%
Pharmaceutical Industry	Yes	3	75.0%	1	25.0%	0	0.0%	2	50.0%	1	25.0%	0	0.0%	0	0.0%
	No	1	25.0%	3	75.0%	4	100%	2	50.0%	3	75.0%	4	100%	4	100%
Hospital/ Health Care Management Board	Yes	25	31.3%	51	67.1%	14	18.2%	32	41.6%	30	39.0%	6	7.8%	24	31.2%
	No	55	68.8%	26	32.9%	63	81.8%	45	58.4%	47	61.0%	71	92.2%	53	68.8%
TOTAL		119		116		116		116		116		116		116	

Table 10 provides the results relating to the types of technologies used in distance education delivery by all organizational survey respondents. The results have been rank ordered and only reflect the responses of those respondents who had indicated that they were providing technology-based distance education programming to health professionals. The majority of respondents reported that the following technologies were used in the delivery of continuing health professional education by distance education: electronic mail (61.4%); Web-based education (59.9%); videoconferencing (59.2%); correspondence materials (57.2%); videotapes (52.0%); and audio teleconferencing (51.5%).

Table 11 presents the results pertaining to accreditation of CHPE programs delivered by technology-based distance education methods. This item asked respondents to indicate whether the distance education programs they offered were accredited by a professional body. These results only reflect the responses of those organizations who had indicated that they were providing technology-based distance education programming to health professionals. Eighty-five percent (85.7%) of School of Medicine respondents and 58.1% of Schools of Nursing reported that their programs were accredited. Thirty-six percent (36.6%) of hospital/health care management boards indicated that their distance education CPE programs were accredited.

Table 12 provides the results pertaining to respondents' reports of formal training and support services offered to faculty or instructors who teach in the continuing professional education programs offered by technology-based distance education. The responses to this item only reflect those organizations who had reported that they were providing technology-based distance education programming to health professionals. The majority of School of Nursing and School of Medicine respondents indicated that they were providing training and support to faculty and instructors who taught in their distance education programs. Eighty-seven percent (87.5%) of schools of nursing and 71.4% of schools of medicine reported that they were providing this type of support. Forty-three percent (43.9%) of hospital/health care management boards reported that they provided formal training and/or support services to instructors who taught in their distance education programs.

Table 13 provides the results pertaining to respondents' reports of the types of formal training and support which are provided to faculty and instructors of their distance education programs. These results only reflect the responses of those organizations who had indicated that they were providing technology-based distance education programming to health professionals as well as faculty development support activities. 'Faculty development seminars/workshops', 'instructional development support materials', 'mentoring by experienced instructors', and 'one-on-one consultation with an educational specialist' were the main types of faculty development activities which were reported by the majority of respondents across the organizational categories. Eighty-nine percent (89.7%) of schools of nursing, 80.0% of schools of medicine and 51.9% of hospital/health care management board respondents indicated that they used 'faculty development seminars and workshops' for providing support services. Sixty-five percent (65.5%) of schools of nursing, 80.0% of schools of medicine, and 57.4% of hospital/health care management board respondents indicated the use of 'instructional development support materials' for supporting faculty and instructors. Sixty-two percent (62.1%) of School of Nursing respondents indicated that 'mentoring' by experienced instructors was a strategy they provided to support instructors. Sixty-nine percent (69.0%) of School of Nursing and 80.0% of School of Medicine respondents also reported the use of 'one-on-one consultation with educational specialists' as means for supporting faculty and instructors teaching through distance education technologies. Other types of support identified by respondents included 'videoconferencing/network training' (N = 4), 'guest presenters/distance modules purchased from outside suppliers' (N = 2), and 'support programs/costs of instructor covered by parent institution' (N = 2).

Table 10 Types of Technologies Used in Distance Education

Technologies Used	N	%	Total
Electronic mail	105	61.4%	171
Web-based education	103	59.9%	172
Videoconferencing	103	59.2%	174
Correspondence materials	99	57.2%	173
Videotapes	89	52.0%	171
Audio teleconferencing	88	51.5%	171
Interactive multimedia CD-ROMS	59	34.1%	173
Fax	55	32.2%	171
Computer conferencing	44	25.7%	171
Audio cassette	36	21.1%	171
Web broadcasts	34	19.9%	171
E-mail list servs	25	14.6%	171
Interactive videodiscs	17	9.9%	171
Cable/broadcast TV	10	5.7%	174
Audiographic teleconferencing	7	4.1%	171

Radio	2	1.2%	172
TOTAL	876		

Table 11 Organizations Reporting Accredited Distance Education Programs

Type of Organization	**Yes**		**No**		**TOTAL**
	N	**%**	**N**	**%**	
School of Nursing	18	58.1%	13	41.9%	31
School of Medicine	6	85.7%	1	14.3%	7
School of Pharmacy	1	100%	0	0.0%	1
National/Prov. Health Professional Association	6	40.0%	9	60.0%	15
Pharmaceutical Industry	4	100%	0	0.0%	4
Hospital/Health Care Management Board	37	36.6%	64	63.4%	101
TOTAL	72		87		159

Table 12 Training/Support Offered to Faculty/Instructors

Type of Organization	**Yes**		**No**		**TOTAL**
	N	**%**	**N**	**%**	
School of Nursing	28	87.5%	4	12.5%	32
School of Medicine	5	71.4%	2	28.6%	7
School of Pharmacy	1	100%	0	0.0%	1
National/Prov. Health Professional Association	6	40.0%	9	60.0%	15
Pharmaceutical Industry	2	50.0%	2	50.0%	4
Hospital/Health Care Management Board	47	43.9%	60	56.1%	107
TOTAL	89		77		166

Table 13 **Types of Formal Training/Support Offered**

Organizations		Faculty dev. seminars/ workshops		Instructional dev. support materials		Instructional development website		Mentoring by experienced instructors		One-on-one consultation with ed. specialist		Fellowships		Bursaries		Teaching award /other recognition	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
School of Nursing	Yes	26	89.7%	19	65.5%	8	27.6%	18	62.1%	20	69.0%	1	3.4%	3	10.3%	3	10.3%
	No	3	10.3%	10	34.5%	21	72.4%	11	37.9%	9	31.0%	28	96.6%	26	89.7%	26	89.7%
School of Medicine	Yes	4	80.0%	4	80.0%	2	40.0%	0	0.0%	4	80.0%	0	0.0%	1	20.0%	2	40.0%
	No	1	20.0%	1	20.0%	3	60.0%	5	100%	1	20.0%	5	100%	4	80.0%	3	60.0%
School of Pharmacy	Yes	1	100%	0	0.0%	0	0.0%	1	100%	1	100%	0	0.0%	0	0.0%	0	0.0%
	No	0	0.0%	1	100%	1	100%	0	0.0%	0	0.0%	1	100%	1	100%	1	100%
National/Prov. Health Prof. Association	Yes	1	12.5%	3	37.5%	0	0.0%	3	37.5%	2	25.0%	0	0.0%	1	12.5%	0	0.0%
	No	7	87.5%	5	62.5%	8	100%	5	62.5%	6	75.0%	8	100%	7	87.5%	8	100%
Pharm. Industry	Yes	0	0.0%	2	100%	1	50.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	No	2	100%	0	0.0%	1	50.0%	1	50.0%	2	100%	2	100%	2	100%	2	100%
Hospital/ Health Care Board	Yes	28	51.9%	31	57.4%	6	11.1%	25	46.3%	22	40.7%	1	1.9%	7	13.0%	4	7.4%
	No	26	48.1%	23	42.6%	48	88.9%	29	53.7%	32	59.3%	53	98.1%	47	87.0%	50	92.6%
TOTAL		99		99		99		99		99		99		99		99	

Table 14 provides the results pertaining to respondents' reports of the location of the audience to whom their distance education programs are provided. The responses to this item only reflect those organizations who had reported that they were providing technology-based distance education programming to health professionals. The main audiences identified across the organizational categories were 'regional' and 'provincial'. Thirty-one percent (31.2%) of School of Nursing respondents reported that their audience was 'provincial', while 32.5% indicated a 'regional' audience. Forty-three percent (43.8%) of School of Medicine respondents indicated that their target audience was 'provincial' in scope, while 18.8% indicated a 'regional' target audience. Twenty percent (20.8%) of School of Nursing respondents also reported a 'national' audience, while 25.0% of schools of medicine also reported a 'national' audience. Sixty-one percent (61.2%) of hospital/health care management board respondents indicated a 'regional' audience, while 28.4% reported a 'provincial' audience. An 'international' audience was identified by 15.6% of schools of nursing; and 12.5% of schools of medicine.

Forty-eight (48.0%) of School of Nursing respondents reported that at least 1 - 25% of participants in their distance education programs during the past 12 months were of a national audience. Forty-two percent (42.9%) of schools of medicine reported that 1 - 25% of their participant audience was of a national scope. The majority of health professional associations (58.3%) and hospital/health care management board respondents (59.8%) indicated that there were no participants in their distance education programs who were from a national audience. Forty-seven percent (47.4%) of schools of nursing and 50.0% of schools of medicine indicated that 1 - 25% of their participant audience during the past 12 months was of an international scope. Fifty-two percent (52.6%) of School of Nursing respondents and 50.0% of School of Medicine respondents indicated that there were no international participants in their programs. Ninety-one percent (91.8%) of hospital/health care management board respondents indicated that there were no international participants in the distance education program offerings of their organization.

Table 14 Location of Distance Education Audience

Type of Organization	Location of Audience								Total
	Regional		Provincial		National		International		
	N	%	N	%	N	%	N	%	
School of Nursing	25	32.5%	24	31.2%	16	20.8%	12	15.6%	77
School of Medicine	3	18.8%	7	43.8%	4	25.0%	2	12.5%	16
School of Pharmacy	0	0.0%	1	50.0%	1	50.0%	0	0.0%	

National/Provincial Health Professional Association	3	15.0%	11	55.0%	6	30.0%	0	0.0%	20
Pharmaceutical Industry	1	25.0%	2	50.0%	1	25.0%	0	0.0%	4
Hospital/Health Care Management Board	82	61.2%	38	28.4%	10	7.5%	4	3.0%	134
TOTAL	114		83		38		18		253

Table 15 provides an overview of the results of the general characteristics of health professionals who participate in the distance learning programs reported by respondents. The majority of respondents across all organizational categories reported that participants in their distance learning programs were not predominantly recent university graduates. Ninety-three percent (93.1%) of schools of nursing, 100% of schools of medicine, 90.9% of health professional associations, and 77.1% of hospital/health care management board respondents indicated that the participants in their distance learning programming were not predominantly recent university graduates. Sixty-six percent (66.7%) of School of Medicine respondents and 51.0% of hospital/health care management board respondents indicated that the participants in their distance learning programs were predominantly rural practitioners, while 25.0% of School of Nursing organizational respondents indicated that participants in their programs were predominantly rural practitioners. Twenty-one percent (21.4%) of School of Nursing respondents and 32.3% of hospital/health care management board respondents reported that participants in their programs were predominantly urban practitioners. Fifty-five percent (55.2%) of School of Nursing respondents indicated that their audience encompassed an even mix of rural and urban practitioners. As well, seventy-two percent (72.7%) of health professional association organizational respondents reported that participants in their distance learning programs were an even mix of rural and urban practitioners. Eighty-five percent (85.7%) of School of Nursing respondents, 72.2% of health professional association respondents and 64.2% of hospital/health care management board respondents indicated that their participants did not require CHPE credit to maintain licensure, whereas 50.0% of School of Medicine respondents reported that their participants required CHPE credit.

Table 15 Characteristics of Distance Education Program Participants

Organizations		Predominantly recent university graduates (<5 years)		Predominantly rural practitioners (population <10,000)		Predominantly urban practitioners (population >10,000)		Even mix of both rural and urban		Require CHPE credit to maintain licensure	
		N	%	N	%	N	%	N	%	N	%
School of Nursing	Yes	2	6.9%	7	25.0%	6	21.4%	16	55.2%	4	14.3%
	No	27	93.1%	21	75.0%	22	78.6%	13	44.8%	24	85.7%
School of Medicine	Yes	0	0.0%	4	66.7%	0	0.0%	2	33.3%	3	50.0%
	No	6	100%	2	33.3%	6	100%	4	66.7%	3	50.0%
School of Pharmacy	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100%
	No	1	100%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Health Professional Association	Yes	1	9.1%	4	36.4%	0	0.0%	8	72.7%	3	27.3%
	No	10	90.9%	7	63.6%	11	100%	3	27.3%	8	72.7%
Pharm. Industry	Yes	1	50.0%	2	100%	0	0.0%	0	0.0%	0	0.0%
	No	1	50.0%	0	0.0%	2	100%	2	100%	2	100%
Hospital/ Health Care Board	Yes	22	22.9%	49	51.0%	31	32.3%	26	27.4%	34	35.8%
	No	74	77.1%	47	49.0%	65	67.7%	69	72.6%	61	64.2%
TOTAL		145		143		143		143		143	

Table 16 presents the results related to respondents' reports of the nature of topics which are provided through their CPE programs. This question item was intended to identify the type and extent of programming which is being delivered to enhance capabilities in the use and application of information and communication technologies among health care practitioners. The results are rank ordered according to frequency of responses and represent the responses of respondents from all organizational categories. Thirty-two percent (32.4%) of all organizational respondents indicated that 'using computers' was a common continuing professional education program which was offered to health care practitioners. Respondents also reported that 'E-mail applications' (29.9%), 'Using the Internet' (25.8%), 'Presentation software' (24.2%), and 'Hospital computer systems' (19.1%) were common information and communication technology-related topics which were covered in continuing professional education programming. Respondents were also provided with an opportunity to identify 'other' continuing professional education topics which were provided to health professionals. The topic areas which were identified included 'Word processing software' (N = 4), 'MDS/RUGS' Software (N = 5), 'Medicare Software' (N = 1), and 'General healthcare software' (N = 2).

Table 17 presents the results of Kruskal-Wallis Analysis of Variance of Ranks to determine the existence of relationships between 'organizational respondent category' and the organizational influences, professional influences and strengths and resources scales. A sum score was calculated for each scale by totalling the individual item ratings. There was no significant relationship between the organizational category and the sum score on the organizational influence scale ($p = 0.190$) at the $<.05$ probability level. School of Pharmacy respondents reported the highest mean score on the organizational influence scale (24.4), followed by schools of medicine (23.2) and schools of nursing (22.3). National/provincial health professional associations reported the lowest mean score on organizational influences (19).

There was also no significant difference between the type of organizational respondent and the sum score on the professional influence scale ($p = 0.302$). Schools of nursing reported the highest mean score on the professional influences scale (24.7), followed by schools of medicine (24.3) and hospital/health care management boards (24). There was also no significant relationship between the type of organizational respondent and their mean score on the organizational strengths and resources scale ($p = 0.053$) at the $<.05$ probability level. Medical and nursing schools did report a higher rating on their perceptions of organizational strengths and resources as it pertained to distance education program development and delivery than other organizational respondents. Schools of nursing (57) and schools of medicine (56) reported a higher mean score on the strengths and resources scale than national/provincial health professional associations (41.9), hospital/health care management boards (52.8) and other organizational respondent categories. The individual items within the strengths and resources scale were also examined using Kruskal-Wallis Analysis of Variance of Ranks to determine the existence of relationships between organizational respondent category and individual strengths and resources items. There were significant differences found between organizational categories and the items: 'priority of my unit' ($p = 0.001$); and 'adequate faculty/subject matter expert support' ($p = 0.014$). These differences were significant at the < .05 level of probability. Schools of medicine reported the highest mean score (4.2) as it pertained to the item 'a priority of my unit'; schools of pharmacy (2.4) and pharmaceutical industry (2.7) respondents reported the lowest mean scores. Schools of pharmacy also reported the lowest mean score on the item 'adequate faculty/subject matter expert support' (2.4), while schools of medicine reported the highest mean score (3.8). Schools of medicine also reported the highest mean score on 'enthusiasm among the target audience' (3.8).

Table 16 Continuing Professional Education Topics

Topics Provided	Yes		Total
	N	%	
Using computers	217	32.4%	669
E-mail applications	200	29.9%	670
Using the Internet	173	25.8%	670
Presentation software	162	24.2%	669
Hospital computer systems	129	19.1%	675
Telemedicine/telehealth	123	18.4%	669
Spreadsheet/database software	123	18.3%	671
Literature databases	122	18.2%	669
Using search engines	92	13.8%	669
Literature search strategies	89	13.3%	669
Electronic health records	85	12.7%	670
Using web browsers	83	12.4%	669
Keyboarding skills	74	11.1%	669
E-journals/text books	70	10.5%	669
Electronic drug databases	53	7.9%	669

Patient education software	38	5.6%	673
Statistics software	23	3.4%	669
Practice management programs	18	2.7%	669
Evaluating quality of Web pages for patient information referrals	16	2.4%	669
TOTAL	1767		

Table 17 **Kruskal-Wallis Test of Organizational Respondent Categories by Factors of Usage Scales**

	Types of Organizations	N	Mean	SD	Mean Rank	Sig.
ORGANIZATIONAL INFLUENCES	School of Nursing	58	22.3	6.3	381.5	0.190
	School of Medicine	10	23.2	5.1	395	
	School of Pharmacy	5	24.4	5.5	448.8	
	Health Professional Assoc	47	19	8.1	310	
	Pharmaceutical Industry	15	22.2	4.1	385.1	
	Hospital/Health Care Board	542	20.5	6	333.7	
TOTAL		677	20.6	6.1		
PROFESSIONAL INFLUENCES	School of Nursing	58	24.7	2.9	360.2	0.302
	School of Medicine	10	24.3	3.9	350.8	
	School of Pharmacy	5	22.8	2.7	223.3	
	Health Professional Assoc	47	23.2	6	319.7	
	Pharmaceutical Industry	15	23.1	2.4	252.3	
	Hospital/Health Care Board	542	24	4.7	341.7	
TOTAL		677	24	4.6		
STRENGTHS & RESOURCES	School of Nursing	58	57	17.8	393.2	0.053
	School of Medicine	10	56	11.2	375	

School of Pharmacy	5	51.4	6.8	312
Health Professional Assoc	47	41.9	26.1	268.9
Pharmaceutical Industry	15	53.5	11.2	333.2
Hospital/Health Care Board	542	52.8	16.6	339
TOTAL	677	52.4	17.5	

Table 18 presents the results of Mann-Whitney analyses pertaining to an organization's provision of technology-based distance education and their corresponding perception of organizational and professional influences, and the existence of strengths and resources within their organization for the delivery of distance education. A sum score was calculated for each scale by totalling the individual item ratings. The mean score for respondents reporting that their organization provided distance education programs was 22.9 on the organizational influence scale, while the mean score of respondents reporting that their organization did not provide distance education programs was 19.9. The Mann-Whitney analysis revealed that there was a significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.000). Organizational respondents indicating that they were providing distance education programs reported a higher score on the organizational factors scale.

The mean score of respondents reporting that their organization provided distance education programs was 24.2 on the professional influence scale, while the mean score of respondents reporting that their organization did not provide distance education programs was 24. The Mann-Whitney analysis revealed that there was no significant difference between the mean rank of these scores at the <.05 probability level (p = 0.796). There was no difference between organizations on their rating of professional factors and whether they did or did not provide distance education programs.

The mean score of respondents reporting that their organization provided distance education programs was 55.8 on the strengths and resources scale, while the mean score of respondents reporting that their organization did not provide distance education programs was 51.5. There was a significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.000). Organizational respondents indicating that they were providing distance education programs reported a higher score on the strengths and resources scale.

Table 19 presents the results of Mann-Whitney analyses pertaining to an organization's provision of technology-based distance education and their corresponding perception of individual strengths and resources within their organization for the delivery of distance education. There were significant differences found between organizations reporting that their organization did provide distance education programs and those that did not on a number of the strengths and resources items. On the items 'a priority of my unit' ($p = 0.000$), 'a priority of organization' ($p = 0.000$), 'administration supportive of the idea' ($p = 0.001$), and 'sufficient administrative/clerical support staff' ($p = 0.020$) providers of distance education reported mean scores which were significantly higher than non-providers at the < .05 probability level. All of these items were related to organizational support factors. On the items 'adequate telecommunication infrastructure' ($p = 0.048$), 'adequate facilities/equipment for supporting distance education development and delivery' ($p = 0.001$), 'convenient personal Internet access among target audience' ($p = 0.022$), and 'convenient personal computer access among target audience' ($p = 0.042$) providers of distance education also reported mean scores which were significantly higher than non-providers at the < .05 probability level. Perception of infrastructure, access to equipment and Internet services were more positive among those organizations who were providing technology-based distance education. Providers of distance education also reported higher mean scores on items related to experience, enthusiasm and sufficient time commitment among target audience at the <.05 level of probability. Organizational respondents who were providing distance education reported that their target audience had high levels of computer, were enthusiastic about technology-based CHPE, and had sufficient time to commit to participation in CHPE.

Table 20 presents the results of Kruskal-Wallis Analysis of Variance of Ranks to determine the existence of relationships between the level of experience (length of time offering distance education programs) and corresponding perceptions of organizational and professional influences, and the existence of strengths and resources within an organization for the delivery of distance education. A sum score was calculated for each scale by totalling the individual item ratings. There was no significant relationship between the years of experience in offering distance education programs and the rating of organizational influences ($p = 0.092$) at the <.05 probability level. Organizational respondents reporting > 20 years of experiences did report the highest mean score on the organizational influence scale (24.6), followed by organizations reporting 16 - 20 years of experiences (24.6). However, the differences between the mean rank of these scores was not significant.

There was also no significant difference between the years of experience in offering distance education programs and the rating of professional influences ($p = 0.455$). Organizations reporting > 20 years of experience in distance education program delivery reported the highest mean score on professional influences (26.3), followed by organizations with 1 - 5 years of experience (24.5) and organizations with 16 - 20 years of experiences (24.4). Scores on the strengths and resources scale also revealed a similar result. There was no significant relationship between the years of experience in offering distance education programs and the rating of organizational strengths and resources (p = 0.360) at the <.05 probability level. Respondents reporting 16 - 20 years of experience reported the highest mean score (61.8), followed by organizations with > 20 years of experience (58.3) and organizations with 1 - 5 years of experiences (57). The individual items within the strengths and resources scale were also examined using Kruskal-Wallis Analysis of Variance of Ranks to determine the existence of relationships between the level of experience (length of time offering distance education programs) and individual strengths and resources items. There were significant differences found between the level of an organization's experience and the items: 'priority of my unit' (p = 0.021); 'experience in technology-based distance education' (p = 0.004); and 'sufficient time commitment for participation among target audience' (p = 0.021). These differences were significant at the < .05 level of probability. Organizations reporting less than 1 year of experience reported the lowest mean score (3.5) on the item 'a priority of my unit', while organizations reporting 'more than 20 years experience' reported the highest mean score (4.7). Organizations reporting less than 1 year of experience also reported the lowest mean score (2.7) on the item 'experience in technology-based distance education'.

Table 18 **Mann-Whitney Tests of Organizational Respondents Providing Distance Education Programming by Factors of Usage Scales**

Does your organizational unit provide technology-based distance education programming to health professionals?

		N	Mean	SD	Mean Rank	Sum of Ranks	Z	Sig.
Organizational Influences	Yes	174	22.9	6.4	421.7	73368.5		
	No	500	19.9	5.8	308.2	154106.5	-6.6	0.000
TOTAL		674	20.6	6.1				
Professional Influences	Yes	174	24.2	4.4	340.8	59295		
	No	500	24	4.6	336.4	168179.99	-0.3	0.796
TOTAL		674	24	4.6				
Strengths & Resources	Yes	174	55.8	17.3	383.2	66684		
	No	500	51.5	17.2	321.6	160791	-3.6	0.000
TOTAL		674	52.4	17.5				

Table 19 **Mann-Whitney Tests of Organizational Respondents Providing Distance Education Programming by Strengths and Resources Factors**

Does your organizational unit provide technology-based distance education programming to health professionals?

		N	Mean	SD	Mean Rank	Sum of Ranks	Z	Sig.
A priority of my unit.	Yes	164	3.7	0.9	407.6	66853.5	-7.21	0.000
	No	478	3	1	291.9	139550		
A priority of organization	Yes	164	3.6	1	382.8	62778	-5.05	0.000
	No	479	3.1	1.1	301.2	144268		
Administration supportive of the idea.	Yes	165	3.9	0.9	361	59560.5	-3.38	0.001
	No	479	3.6	0.9	309.3	148130		
Sufficient administrative/clerical support staff.	Yes	166	3.1	1.2	351	58260.5	-2.33	0.020
	No	479	2.8	1.1	313.3	150075		
Specialized staff to design the courses.	Yes	165	3	1.3	342.2	56462.5	-1.75	0.080
	No	476	2.8	1.3	313.7	149299		
Experience in technology-based distance education.	Yes	166	3.4	1.1	366	60760.5	-3.87	0.000
	No	473	2.9	1.2	303.9	143720		

Adequate budget for technology-based distance education programs.	Yes	166	3	1.4	342.2	56812	-1.67	0.095
	No	477	2.8	1.4	315	150234		
Telecommunication costs are reasonable.	Yes	166	3.4	1	331.7	55060	-0.65	0.518
	No	481	3.3	1	321.4	154568		
Adequate telecommunication infrastructure.	Yes	165	3.5	1.1	346.4	57156	-1.98	0.048
	No	479	3.3	1.1	314.3	150534		
Adequate facilities/equipment for supporting distance education development and delivery.	Yes	166	3.5	1.1	363.1	60276.5	-3.27	0.001
	No	480	3.1	1.3	309.8	148705		
Adequate faculty/subject matter expert support.	Yes	165	3.5	1.1	375.3	61924.5	-4.46	0.000
	No	477	3.1	1.2	302.9	144479		
Convenient personal Internet access among target audience.	Yes	166	3.6	1	352	58428	-2.3	0.022
	No	482	3.3	1.2	315	151848		
Convenient personal computer access among target audience.	Yes	166	3.6	1	344.3	57158	-2.03	0.042
	No	474	3.4	1.2	312.2	147962		
Adequate level of computer experience among target audience.	Yes	166	3.4	1	342	56777.5	-1.77	0.076
	No	475	3.2	1.1	313.7	148984		
Enthusiasm among target audience.	Yes	166	3.7	0.9	346.7	57556.5	-2.12	0.034
	No	477	3.5	0.9	313.4	149490		

Organizational support from employers of target audience.	Yes	165	3.7	0.9	349.5	57671	-2.51	0.012
	No	474	3.5	1.1	309.7	146809		
Sufficient time commitment for participation among target audience.	Yes	166	3.2	1.1	330.4	54842	-0.82	0.410
	No	474	3.1	1.2	317	150278		

Table 20 **Kruskal-Wallis Test of Distance Education Programming Experience by Factors of Usage Scales**

How long have distance education programs been offered by your organizational unit?						
		N	Mean	SD	Mean Rank	Sig.
Organizational Influences	< 1 year	35	22.8	4.3	82.3	0.092
	1-5 years	89	22.9	6	86.7	
	6-10 years	22	23.7	7.8	96.8	
	11-15 years	11	18.9	7.5	56.1	
	16-20 years	10	24.6	6.6	104.1	
	> 20 years	7	24.6	11.2	120	
TOTAL		174	20.6	6.1		
Professional Influences	< 1 year	35	23.9	3.4	76.7	0.455
	1-5 years	89	24.5	3.9	90.1	
	6-10 years	22	23.7	6.4	90.1	
	11-15 years	11	22.2	7.7	77.9	
	16-20 years	10	24.4	2.8	86.4	
	> 20 years	7	26.3	2.9	116.5	
TOTAL		174	24	4.6		
Strengths & Resources	< 1 year	35	51.5	16.7	71.1	0.36
	1-5 years	89	57	16.7	90.6	
	6-10 years	22	53.9	20.2	87.2	
	11-15 years	11	56.8	23.1	98.8	
	16-20 years	10	61.8	14.5	101	
	> 20 years	7	58.3	11.5	94.8	
TOTAL		174	52.4	17.5		

Table 21 presents the results of Mann-Whitney analyses pertaining to respondents' reported access to organizational resources and corresponding perceptions of organizational and professional influences, and the existence of strengths and resources within an organization for the delivery of distance education. A sum score was calculated for each scale by totalling the individual item ratings. The mean score for respondents reporting access to the resources of a distance education division was 23.8 on the organizational influence scale, while the mean score of respondents reporting that their organizational unit did not have access to the resources of a distance education division was 21.3. There was a significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.020). Organizational units reporting that they had access to the resources of a distance education division reported a higher score on the organizational factor scale.

The mean score of respondents reporting access to the resources of a distance education division was 24.6 on the professional influence scale, while the mean score of respondents reporting that their organizational unit did not have access to the resources of a distance education division was 23.8. There was no significant difference between the mean rank of these scores at the <.05 probability level (p = 0.294). There was no difference between organizational units on whether they had access to the resources of a distance education division and their perception of professional factors.

The mean score of respondents reporting that they had access to the resources of a distance education division was 57.4 on the strengths and resources scale, while the mean score of respondents reporting that their organizational unit did not have access to the resources of a distance education division was 53.7. There was no significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.084). There was no difference between organizational units on whether they had access to the resources of a distance education division and their perceptions of organizational strengths and resources.

Table 22 provides the results of Mann-Whitney analyses pertaining to respondents' reports of 'partnering' and corresponding perception of organizational and professional influences, and the existence of strengths and resources within an organization for the delivery of distance education. A sum score was calculated for each scale by totalling the individual item ratings. The mean score of respondents reporting that they had formed partnerships with other organizations was 23.8 on the organizational influence scale, while the mean score of respondents reporting that their organizational unit had not formed partnerships was 20.7. There was a significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.005). Organizational units reporting that they had formed partnerships for the purposes of technology-based distance education development and delivery reported a higher score on the organizational factor scale.

The mean score of respondents reporting that they had formed partnerships with other organizations was 24.6 on the professional influence scale, while the mean score of respondents reporting that they had not formed partnerships with other organizations was 23.4. There was no significant difference between the mean rank of these scores at the <.05 probability level (p = 0.179). There was no difference between organizations on whether they had formed partnerships with other organizations and their perception of professional factor influences. The mean score of respondents reporting that they had formed partnerships with other organizations was 57.8 on the strengths and resources scale, while the mean score of respondents reporting that they had not formed partnerships was 52.1. There was a significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.037) Organizations reporting the formation of partnerships reported a higher score on the strengths and resources scale.

The individual items within the strengths and resources scale were also compared to respondents' reports of 'partnering'. The scores on these items were examined using Mann-Whitney analyses. There were significant differences found between organizations reporting partnering and the items: 'a priority of my unit' (p = 0.004); 'administration supportive of the idea' (p = 0.047); 'experience in technology-based distance education' (p = 0.003). These differences were significant at the < .05 level of probability. Organizations indicating partnerships reported a mean score of 3.9, while those who did not indicate partnerships reported a mean score of 3.4 on the item 'a priority of my unit'. Organizations indicating partnerships also indicated a higher mean score on items 'administration supportive of the idea' (4) and 'experience in technology-based distance education' (3.5).

Table 21 **Mann-Whitney Tests of Respondents' Access to Organizational Resources by Factors of Usage Scales**

Does your organizational unit have access to the resources of a distance education division within your parent institution?

		N	Mean	SD	Mean Rank	Sum of Ranks	Z	Sig.
Organizational Influences	Yes	77	23.8	6.3	68.3	5261.5	-2	0.02
	No	47	21.3	6.2	53	2488.5		
TOTAL		124	20.6	6.1				
Professional Influences	Yes	77	24.6	4	65.1	5015	-1	0.294

	No	47	23.8	5.1	58.2	2735		
TOTAL		124	24	4.6				
Strengths & Resources	Yes	77	57.4	16.5	66.9	5148		
	No	47	53.7	17.4	55.4	2602	-2	0.080
TOTAL		124	52.4	17.5				

Table 22 **Mann-Whitney Tests of Respondents' Report of Partnering by Factors of Usage Scales**

Has your organizational unit formed partnerships with other departments, schools, businesses, or organizations for the purposes of sharing financial, human, and/or technical resources for CHPE development and delivery?

		N	Mean	SD	Mean Rank	Sum of Ranks	Z	Sig.
Organizational Influences	Yes	110	23.8	5.7	91.5	10063.5		
	No	57	20.7	7.2	69.6	3964.5	-3	0.005
TOTAL		167	20.6	6.1				
Professional Influences	Yes	110	24.6	4	87.6	9636.5		
	No	57	23.4	5.3	77	4391.5	-1	0.179
TOTAL		167	24	4.6				
Strengths & Resources	Yes	110	57.8	15.2	89.6	9857		
	No	57	52.1	19.3	73.2	4171	-2	0.037
TOTAL		167	52.4	17.5				

Table 23 provides the results of Mann-Whitney analyses pertaining to respondents' reports of whether the organization's parent institution offered distance education courses and corresponding perceptions of organizational and professional influences, and the existence of strengths and resources within an organization for the delivery of distance education. A sum score was calculated for each scale by totalling the individual item ratings. The mean score of respondents reporting that their parent institution offered distance education was 23.7 on the organizational influence scale, while the mean score of respondents reporting that their parent institution did not offer distance education courses was 20.4. There was a significant difference between the mean rank of these scores at the <.05 level of probability (p = 0.024). Organizations reporting that their parent institution offered distance education courses reported a higher organizational influence score.

The mean score of respondents reporting that their parent institution offered distance education was 24.7 on the professional influence scale, while the mean score of respondents reporting that their parent institution did not offer distance education courses was 23.2. There was no significant difference between the mean rank of these scores at the <.05 probability level (p = 0.888). There was no difference between organizations on whether their parent institution offered distance education courses and their perception of the influence of professional factors. The mean score of respondents reporting that their parent institution offered distance education was 57.7 on the strengths and resources scale, while the mean score of respondents reporting that their parent institution did not offer distance education courses was 51.9. There was no significant difference between organizations on whether their parent institution offered distance education courses and their perception of organizational strengths and resources.

The individual items within the strengths and resources scale were also compared to the respondents' report of whether the organization's parent institution offered distance education courses. The scores on these items were examined using Mann-Whitney analyses. There were significant differences found between organizations reporting that their parent institution offered distance education courses and the items: 'experience in technology-based distance education' (p = 0.042) and 'adequate facilities/ equipment for supporting distance education development and delivery' (p = 0.034). These differences were significant at the < .05 level of probability. Organizations reporting that their parent institution offered distance education courses reported a mean score of 3.4, while those respondents reporting that their organizations did not offer distance education courses scored 2.94 on the item 'experience in technology-based distance education'. As well, organizations reporting that their parent institution offered distance education courses reported a mean score of 3.6, while those respondents reporting that their organizations did not offer distance education courses scored 3.1 on the item 'adequate facilities/equipment for supporting distance education development and delivery'.

Table 23 Mann-Whitney Tests of Respondents' Report of Institutional Experience by Factors of Usage Scales

Does your parent institution offer distance education courses?

		N	Mean	SD	Mean Rank	Sum of Ranks	Z	Sig.
Organizational Influences	Yes	81	23.7	5.9	64.9	5255	-2.3	0.024
	No	38	20.4	7.6	49.6	1885		
TOTAL		119	20.6	6.1				
Professional Influences	Yes	81	24.7	3	59.7	4835.5	-0.1	0.888
	No	38	23.2	7.5	60.6	2304.5		
TOTAL		119	24	4.6				
Strengths & Resources	Yes	81	57.7	15.3	63.1	5109	-1.4	0.156
	No	38	51.9	20	53.5	2031		
TOTAL		119	52.4	17.5				

Conclusion/Findings

The response rate to questionnaire-survey studies is always a concern for researchers. Traditionally, questionnaire-survey research methods have resulted in lower response rates than other research methodologies. In this study, a number of strategies were used to increase the survey response rate. First, a cover letter was included with each survey that detailed the study's purpose and the submission deadline. After the first submission deadline had passed, a second copy of the survey was mailed to non-respondents. Included with this survey was a follow-up letter and a new submission deadline. After the second deadline had passed, reminder letters were sent to a stratified sample of non-respondents. The highest response rates were received from School of Medicine, School of Pharmacy, and School of Nursing organizational respondents. This was not surprising given that these organizational respondent categories represented academic institutions with a mission for developing and delivering higher educational programming. The lowest response rates were for the pharmaceutical industry and hospital/health care management board organizations. These organizations do not have a typical mandate to lead the development and delivery of continuing education and training programs which may have influenced the respondent's decision to participate in the survey study.

Physicians and nurses comprise the largest health professional groups in the country and they also comprise the largest groups in rural and remote regions of Canada. The majority of schools of nursing and schools of medicine reported that they provide technology-based distance education programming to health professionals. The majority of schools of pharmacy, national/provincial health professional associations, pharmaceutical industry respondents, and hospital/health care management boards respondents reported that they were not providing distance continuing professional education programming. The results also indicate that schools of nursing and medicine reported the greatest level of experience in the delivery of continuing professional education programming by technology-based distance education. The majority of nursing and medical schools that indicated involvement in technology-based continuing professional education delivery also reported that their parent organization offered distance education courses and that they had access to distance education resources within the parent institution. Institutional experience may also be an important characteristic of those organizational units involved in technology-based distance education delivery.

The majority of School of Nursing and School of Medicine respondents reported that the factors which had the greatest influence on their decision to offer technology-based distance education included:

- addressing CHPE needs of rural/remote health professionals;
- increasing opportunities for flexible CHPE access;
- part of the organization's mission.

An interesting finding pertained to the factor 'less expensive delivery modality'. A majority of hospital/health care management board organizational respondents indicated that 'less expensive delivery modality' was a significant factor which influenced their decision to offer continuing professional education by technology-based distance education. However, medical and nursing schools indicated that this factor was not significant in their decision to offer technology-based distance education. The main reason for this difference between organizational respondents may be related to the significant costs which are associated with the training of rural and remote health care practitioners. Hospitals and health care organizations often have to incur travel and accommodation costs, and replacement staff salaries to provide workplace-related training and education to health professionals. Technology-based distance education enables these employers to reduce these costs by providing training and educational programs at the health professional's work location. This reduces the need for travel and accommodations and in some instances may reduce replacement salary costs. Hospital/health care management board respondents also reported that 'addressing mandatory CE needs of health professionals' was an important factor. This finding also suggests the importance of employer-related responsibilities in ensuring that health professionals have access to accredited programming to maintain professional and clinical competencies.

The costs associated with technology-based distance education are often higher during the program development stages. There are often costs associated with instructional material and media development and the need for more specialized human resources. These costs are normally higher than those that would be associated with the delivery of traditional face-to-face training or instruction. However, technology-based distance education programs normally result in lower delivery costs over the long-term when compared to costs associated with face-to-face teaching in on-campus or workplace sites. In this study, the majority of School of Nursing respondents reported that 'tuition/registration fees' and 'provincial government grants' were the main sources of support for their distance education programming. School of Medicine respondents reported that 'industry educational grants' were a main source of support for their distance education programs. The results suggest that a variety of funding sources are utilized by nursing schools to cover costs associated with the development and delivery of technology-based continuing professional education. Industry sponsorship appears to be of greater importance in supporting technology-based continuing professional education programming which is delivered through the Medical School.

The majority of respondents from the organizational categories of schools of nursing, schools of medicine and hospital/health care management boards reported that they had formed partnerships for the purpose of sharing financial, human and/or technical resources. Across organizational categories, the most significant type of partnership was that which was formed with other educational institutions. Schools of nursing indicated that partnerships with other departments in the parent institution was also an important type of partnership. Schools of medicine, however, reported a much lower level of importance to forming partnerships with other departments in the parent institution. Partnerships with provincial and federal government organizations and community-based agencies were not identified as significant partnership types by the majority of respondents nor across the organizational respondent categories.

The distance education technologies which appear to be used the most by respondents in the delivery of continuing professional education by technology-based distance education are:

- electronic mail;
- Web-based education;
- videoconferencing;
- correspondence materials;
- videotapes;
- and audio teleconferencing.

Electronic mail, Web-based education technologies, and videoconferencing systems appear to be the technologies which are used to the greatest extent by the organizational respondents.

The majority of School of Nursing and School of Medicine respondents indicated that they were providing training and support to faculty and instructors who taught in their distance education programs. ‘Faculty development seminars/workshops’, ‘instructional development support materials’, ‘mentoring by experienced instructors’, and ‘one-on-one consultation with an educational specialist’ were the main types of faculty development activities which were reported by the majority of respondents across the organizational categories.

The main audiences of technology-based continuing professional education programs were ‘regional’ and ‘provincial’ in nature, and the majority of respondents reported that participants in their distance learning programs were not predominantly recent university graduates. A majority of School of Medicine and hospital/health care management board respondents indicated that participants were predominantly rural practitioners. The majority of School of Nursing, health professional association and hospital/health care management board respondents indicated that participants did not require CHPE credit to maintain licensure, whereas accreditation and CHPE credit appeared to be more important for School of Medicine respondents. These findings would suggest that experienced practitioners are accessing technology-based distance education programs and CHPE programs provided through schools of medicine and hospital organizations are targeting rural practitioners. The rationale for these findings may be related to mandatory CHPE requirements for physicians and the use of technology-based distance education programs by health care organizations to address the CHPE needs of rural and remote health care practitioners. Schools of nurses appear to be providing their distance education programs to a more diverse population of health professionals, including both urban and rural health care professionals.

An important purpose of the survey was to identify the type and extent of programming which CHPE providers were delivering to enhance capabilities in the use and application of information and communication technologies among health care practitioners. The results indicate that the most common ICT-related CHPE topics being provided across all organizational respondents included:

- Using computers;
- E-mail applications;
- Using the Internet;
- Presentation software;
- Hospital computer systems.

The organizational influences scale encompassed items which were intended to measure the influence of organizational factors on the likelihood of ICT adoption in continuing professional education delivery. The results indicate that the type of organization (e.g. academic, hospital, industry, health professional association) did not influence perceptions of organizational influences, nor did years of experience in offering distance education programs. Organizations reporting that they were providing distance education programs did report a significantly higher score on the organizational factors scale. Organizational units reporting that they had access to the resources of a distance education division, had formed partnerships for the purposes of technology-based distance education development and delivery, and their parent institution offered distance education courses also reported higher organizational influence scores. Organizational factors included ‘vision within my organization for technology-based distance education is’; ‘support from the leaders in my organization for technology-based distance education’; ‘adequacy of my organization’s technical infrastructure for technology-based distance education’; ‘support of technology-based distance education in my organization’; ‘funding and incentives for technology-based distance education that are available in my organization'; 'experiences in the past that my organization has had with technology-based distance education'. Organizations reporting a positive perception of these organizational factors were more likely to be providers of technology-based distance education, to have access to the resources of a distance education division, and to have formed partnerships.

The professional influences scale comprised items which were intended to measure the influence of professional factors. These included items such as: 'My peers and colleagues believe the Internet is an important tool'; 'In the professional field in which I work, many people are Internet users'; 'In the professional field in which I work, most people think that technology-based distance education is important'; 'Distance learning is likely to contribute to the solution of learning-related problems relevant to the professional field in which I work'; 'It is my personal opinion that technology-based distance education will improve teaching and learning'. The results indicate that the type of organization (e.g. academic, hospital, industry, health professional association) did not influence perceptions of professional influences. Organizations reporting that they were providing distance education programs did not report a more positive perception of professional influences than providers who were not providing distance education. As well, there was also no relationship between years of experience in offering distance education programs, access to the resources of a distance education division, the formation of partnerships, whether a parent institution offered distance education or not and perceptions of the influence of professional factors. Factors of professional influence do not appear to be a major impetus to the provision of distance education.

The strengths and resources scale included items related to the availability of resources (e.g. funding, human resources, facilities/equipment, instructors), telecommunication costs and infrastructure, availability of technology access among target audience, attitudes, commitment and level of perceived computer experience among target audience, and support from employers of target audience. Perceptions of items related to infrastructure, access to equipment and Internet services were more positive among those organizations who were providing technology-based distance education. Providers of distance education also reported higher mean scores on items related to experience, enthusiasm and sufficient time commitment among target audience. Organizational respondents who were providing distance education reported that their target audience had high levels of computer experience, were enthusiastic about technology-based CHPE, and had sufficient time to commit to participation in CHPE.

Main Conclusions

- Canadian schools of medicine and nursing are responsible for a significant amount of the technology-based distance education programs which are offered as CHPE to health professionals.

- Canadian schools of medicine and nursing report the highest level of experience in technology-based distance education programs which are offered as CHPE to health professionals.
- Existing educational technology resources and expertise (human, technical and infrastructure) within an organization are important factors influencing the likelihood of a CHPE organizational unit being a provider of technology-based distance education programs.
- Factors related to 'financial gain' do not influence an academic CHPE organizational unit's decision to provide technology-based distance education. Academic CHPE providers are more likely to provide technology-based distance education as a means for addressing needs of rural/remote health professionals; to increase opportunities for flexible CHPE access; and to fulfill an organization's mission.
- Hospital/health care management boards favor technology-based distance education as a more 'cost-effective' means for addressing mandatory CHPE needs of health professionals.
- Schools of medicine report a high level of dependency on 'industry' funding as a means of support for technology-based distance education program development and delivery.
- Partnering, whether that be with other organizations and institutions or other internal departments, appears to be a significant characteristic of technology-based distance education program development and delivery by Canadian CHPE providers.
- Schools of medicine reported a lower level of importance on forming partnerships with other internal departments in the parent institution when compared to other academic organizations.
- Partnerships with provincial and federal government organizations and community-based agencies were not identified as significant partnership types.
- Internet-based technologies (e.g. E-mail and the World Wide Web) and videoconferencing are the most common educational technologies used by CHPE providers in technology-

based distance education programming.

- Technology-based Canadian CHPE providers are mostly targeting 'regional' and 'provincial' audiences; not international.

- Participants in technology-based CHPE programs are varied and include experienced health professionals.

- School of Medicine and hospital/health care management board respondents are addressing the needs of a predominantly rural practitioner audience. Schools of nursing are addressing the needs of both urban and rural practitioners through their technology-based CHPE programs.
- The most common ICT-related CHPE topics being provided to Canadian health professionals include: using computers; e-mail applications; using the Internet; presentation software; and hospital computer systems.

- Providers of technology-based CHPE distance education programs are more likely to report a positive perception of: supportive organizational factors; technological infrastructure, access to equipment and Internet services; and level of computer experience, enthusiasm and commitment among their distance education programming target audience.

Recommendations

1. ***Information and communication technologies (ICT) play a significant role in the delivery of continuing health professional education (CHPE) programming which addresses the mandatory continuing professional education and lifelong learning needs of rural, remote and northern health professionals. These technologies are essential in facilitating effective distance education programming which maintains the competencies of these practitioners and reduces the level of professional isolation they experience. Access to and use of ICTs in CHPE delivery are vital components of any effective strategy to enhance retention and recruitment of rural health care providers.***

One of the distinguishing characteristics of a profession is the commitment by its members to the promotion of continued study and lifelong learning (Buchholz, 1979). In order to provide high-quality health care services, health professionals require access to effective ongoing professional development and continuing education programs. With the rapid advances which are occurring in the health sciences, it is becoming increasingly challenging for health care professionals to stay abreast of the latest health research information (Whitten, Ford, Davis, Speicher, & Collins, 1998). Knowledge in the health sciences is constantly expanding as new information is published, disseminated, and quickly updated or revised. In this context, the health care practitioner is placed in the unenviable position of having to provide the best health care to the public while trying to use and apply a rapidly changing body of knowledge (Lorenzi, Kues, & Anthony, 1984).

In Canada, the trend appears to be towards greater use of ICTs in the health care system and in the continuing education of health professionals. In recent years, Internet-based technologies have been adopted as a means for delivering information that can be linked to patient care issues in a timely and interactive fashion (Peterson et al., 1999; Anderson et al., 1999). The Internet has the potential to widen continuing education access, increase flexibility for health professionals, and improve the quality of training and education they receive. The use of the Internet as a knowledge translation medium can also lead to improved cost-effectiveness by enabling new target groups to be reached and higher-quality learning outcomes to be gained at a lower marginal cost per adult learner. The use of Internet technologies and the increased capacities of ICTs are contributing to a movement away from traditional CHPE.

In this study, hospital/health care management board respondents reported that 'addressing mandatory CHPE needs of health professionals' was an important factor which influenced their decision to provide technology-based CHPE. This finding suggests the importance of employer-related responsibilities in ensuring that health professionals have access to accredited CHPE programming to maintain competencies. Although potential users of programs may or may not require mandatory CHPE credits for maintaining licensure, the results do suggest that employers place a high level of importance on CHPE credits.

2. ***Academic institutions are responsible for providing the majority of continuing health professional education (CHPE) programming via technology-based distance education. Academic institutions view this programming as an important part of their mission and commitment to addressing and supporting the lifelong learning needs of health professionals, particularly those practicing in rural and remote regions of Canada.***

The results from this study confirm that Canadian schools of medicine and nursing are responsible for a significant amount of the technology-based distance education programs which are offered as CHPE to health professionals. Canadian schools of medicine and nursing also report the highest level of experience in technology-based distance programs which are offered as CHPE to health professionals.

These academic CHPE providers are more likely to provide technology-based distance education as a means for addressing needs of rural/remote health professionals; to increase opportunities for flexible CHPE access; and to fulfill an organization's mission. These institutions are less likely to be providing technology-based CHPE as a way to increase revenue for the institution. Canadian CHPE providers are mostly targeting 'regional' and 'provincial' audiences and School of Medicine and hospital/health care management board respondents are addressing the needs of a predominantly rural practitioner audience. Schools of nursing appear to be addressing the needs of both urban and rural practitioners through their technology-based CHPE programs.

3. ***The Internet and videoconferencing are the main educational technologies which are being used by Canadian continuing health professional (CHPE) providers in the delivery of technology-based continuing professional education.***

Electronic mail, Web-based education, and videoconferencing systems appear to be the technologies which were reported as being used the most by the organizational respondents. The growth of the Internet and the World Wide Web have created new opportunities for providing distance education. Proponents of the Internet suggest that it has had far greater impact on global communications than any other previous communication technology development. Greater Internet developments in the future will include continued improvements in speed of Internet access as ISDN (Integrated Services Digital Network) line developments increase the potential for downloading large files, such as real-time video. Proponents of online CHPE suggest that more and more courses will be delivered through the World Wide Web (WWW) by accredited CHPE Web Service providers. Health professionals will be able to pay for CHPE services using digital cash or credit cards, and submit on-line evaluations using the Web.

The Internet is an excellent location for medical reference material as information is universally available, easily updated and quickly obtained (Huntley, 1998). Using the Internet, CHPE can easily be delivered to the site of clinical activity (Peterson et al., 1999). Internet-based CHPE is also advantageous because it allows the user to select the content, pace, and place of learning. It allows health care providers to obtain CHPE from regional, national, and international experts without the need to travel. The main benefits of Internet-based CHPE include easy access, low expense, interactive multimedia format, and an ability to create interactive clinical cases (Tanner et al., 2001; Richardson & Norris, 1997). The flexibility of HTML, the language in which Web pages are written, allows for high-quality video and audio to be presented (Allen, 2001). Electronic publishing can present ideas that would be impossible in printed text, using multimedia components such as sound and movies (Ruskin et al., 1996). Many Web-based materials can easily be stored on a CD-ROM and used locally within a PC with access speeds far higher than those achievable with most on-line courses. According to Turchin & Lehmann (2000) the WWW provides opportunities for the development of new educational tools and facilitates learning through interactivity and self-paced study. Publication on the Internet offers the added advantages that information can be distributed worldwide and can be easily and rapidly updated to reflect the state of the art.

Videoconferencing, also known as videoteleconferencing, and interactive television, is a presentation mode that can link an instructor and adult learners at various remote sites using a two-way audio and video connection (Havice & Knowles, 1995; Kaufman & Brock, 1998; Sen Cupta, Wallace, Clark, & Bannan, 1998; Brown, 1994). Videoconferencing technology has been rapidly emerging as an increasingly useful tool for improving patient care delivery and expanding access to CHPE. As pressure mounts to reduce health care delivery costs and to increase access to quality medical care, the efforts of many individual hospitals, regional health care systems, and governments to install interactive videoconferencing systems has quickly been intensifying (Brown, 1994). The emergence of the relatively inexpensive compressed video systems that permit two-way video and audio interaction has increased the acceptance of this communications modality in situations where face-to-face instruction was the established norm.

Videoconferencing systems have undergone significant growth in recent years because of increased digital transmission options at reduced costs, vast improvements in video compression technologies, and improvements in the systems with an associated decrease in their cost. The main interest in videoconferencing is based on the interactive, real-time two-way communication which it permits. This interactive communication allows participants at two or more sites to receive immediate clarification and also enables instructors to garner immediate feedback from participants which allows them to adjust their presentations accordingly (Fairbanks & Viens, 1995; Burleson & Sugimoto, 1984). Video transmissions appear on a monitor, much like a traditional television, while sound emanates through the system's speakers. The signal transmission is usually so rapid that the sender and receiver can interact in a simultaneous manner.

4. ***Organizational support is a critical factor in the development and expansion of resources for the successful and sustainable delivery of technology-based distance education to rural and remote health professionals.***

The availability of technological infrastructure and specialist support to CHPE providers are important factors which influence the likelihood of technology-based CHPE delivery. In this study, providers of technology-based CHPE distance education programs were more likely to report a positive perception of supportive organizational factors. Organizational support through the provision of human and financial resources and technical infrastructure are essential for success. According to Bates (2000) appropriate technology infrastructure is an essential requirement for technology-based education. The integration of technology in education and training places an increasing priority on an institution's technology plan. As a result, there is often a need for a systematic process in which training and education needs are identified and taken into account in technology planning (Bates, 2000).

Existing educational technology resources and expertise (human, technical and infrastructure) within an organization are important factors influencing the likelihood of a CHPE organizational unit being a provider of technology-based distance education programs. The majority of nursing and medical schools that indicated involvement in technology-based CHPE delivery also reported that their parent organization offered distance education courses and that they had access to distance education resources within the parent institution. Institutional experience was an important characteristic of those organizational units involved in technology-based distance education delivery.

The development of high-quality Web-based education systems necessitates a range of specialist skills. Educational technology staff, such as graphic designers and HTML programmers will be required to support the development and application of educational materials. Educational technology specialists who provide instructional design, faculty development, project management, and evaluation support to faculty will also be required to support the use of technology for training and education (Graves et al., 1997). According to Bates (2000) the centralization of educational technology support services may be appropriate in a new institution with a commitment to make ICTs a focus of its vision and strategy. However, such a strategy is less likely to be appropriate for the old or well-established divisional universities with large and powerful faculties. In this study, medical schools were less likely to report the formation of partnerships with internal departments within the parent institution. This might suggest the existence of a certain level of concern among medical school academic units that centralization of educational technology services may weaken the school's control over the teaching process. These organizations may prefer to establish their own 'flexible learning or multimedia unit'. This type of model could contain a mix of centralization and decentralization. A small 'Center for Educational Technology' with a few highly specialized and skilled staff could coordinate and facilitate collaboration between faculty members, subject matter experts and support units.

5. ***The use of information and communication technologies (ICTs) in the delivery of continuing health professional education (CHPE) places unique and special demands on instructors and subject matter experts (SMEs) who are unfamiliar with these technologies in training and educational delivery. Faculty and instructional development support are key services to assist instructors and trainers in the effective use of ICTs in continuing professional education.***

The majority of School of Nursing and School of Medicine respondents indicated that they were providing training and support to faculty and instructors who taught in their distance education programs. 'Faculty development seminars/workshops', 'instructional development support materials', 'mentoring by experienced instructors', and 'one-on-one consultation with an educational specialist' were the main types of faculty development activities which were reported by the majority of respondents across the organizational categories. Support for instructors and SMEs in the use of information and communication technologies (ICTs) is an essential prerequisite for successful technology-based instruction. A comprehensive and systematic approach to technical and professional support for faculty is required (Bates, 2000). The establishment of an educational technology support unit to assist faculty with development activities is a necessity, as is a focus on faculty development programs and services. Faculty development is reported to work best when the institution has "a culture pervaded by the use of technology and supported by a wide range of strategies....a strong strategic plan in which the use of technology for teaching plays a prominent role....support from senior leadership for the use of technology for teaching....support, in a wide variety of ways, for faculty members who wish to use technology for teaching" (Bates, 2000, p.99).

According to Ranstrom (1997) ample orientation efforts must be targeted at faculty and learners in order to assist them in becoming familiar with the variety of equipment they may need to use. Orientation sessions may be of particular importance for faculty, many of whom may need to alter their teaching styles in order to use the equipment most effectively (Fairbanks & Viens, 1995; Dirksen, 1993). An orientation session can provide faculty with the opportunity to learn new strategies for overcoming the challenges of facilitating learning at a distance (Kaufman & Brock, 1998).

6. ***Health professionals require a fundamental understanding of information and communication technologies (ICTs) so they are able to utilize these technologies in pursuing lifelong and continuing professional education opportunities. Appropriate stakeholders need to ensure that optimal efforts are made to provide continuing health professional education (CHPE) opportunities so health care practitioners are able to develop the skills needed for optimal use of ICT systems.***

It will become increasingly difficult to accept people as being fully educated if they do not know how to use the Internet to communicate with other professionals; if they do not know how to find Web sites that will provide relevant and reliable information in their field of study (Bates, 2000). Learning in the workplace will be initiated by individuals as part of their working lives. It will be informal (that is, not leading to any formal qualification), self-directed, and piecemeal (broken into small chunks of learning, some as small as a few minutes a day) (Bates, 2000). The learning context will also need to enable people to work alone, interacting with learning material (which may be available locally or remotely); work collaboratively (and in equal relationship) with peers at different remote sites (Bates, 2000).

According to Moehr and Grant (2000) Canadian health professional students need a basic knowledge of the capabilities and limitations of information systems. Rowe et al. (1995) surveyed all first-year family medicine residents from Canadian university-affiliated programs. Only 13% of respondents reported being very or extremely comfortable with computers, while 29% indicated they were somewhat comfortable and 24% not at all comfortable. Seventy one percent of residents (71%) believed that teaching computer use should be a mandatory component of family medicine training programs and 42% of respondents thought that evaluation of this training should be incorporated into the College of Family Physicians of Canada program evaluation. The results of this study indicate that the most common ICT-related CHPE topics being provided to Canadian health professionals include: using computers; e-mail applications; using the Internet; presentation software; and hospital computer systems.

7. ***Technology-based continuing health professional education (CHPE) development and delivery costs are generally higher than those associated with face-to-face CHPE delivery. Many organizations undertake these programs as a means for addressing the mission of their institution or for addressing the mandatory CHPE requirements of rural, remote and northern health professionals. External funding to support such initiatives is essential to offset those costs which are normally not covered in institutional operating budgets.***

In this study, the majority of School of Nursing respondents reported that 'tuition/registration fees' and 'provincial government grants' were main sources of support for their distance education programming. School of Medicine respondents reported that 'industry educational grants' were a main source of support for their distance education programs. According to Bates (2000) if technology-based CHPE is to be a key component of the institution, then the institution has to build it into its base operating budget (Bates, 2000). Provincial and federal government departments and agencies also have an important role to play as it pertains to funding technology-based CHPE. Bates (2000) believes that 'earmarked government funding' is a good strategy to get institutions to pay attention to developing and delivering technology-based distance education.

The provision of an equitable and sustainable level of health care in rural communities is a challenge due in part to the difficulties associated with recruiting and retaining rural health care providers. Rural health care delivery is a demanding and challenging form of practice regardless of the profession. As an example, the rural physician or nurse practitioner frequently practices in an isolated environment with inadequate resources and limited or distant specialist back-up resources. This isolation necessitates a level of clinical competence beyond that of their urban health care peers. This isolation also makes it difficult for the health care provider to maintain their professional competencies. Professional isolation is believed to be related to job dissatisfaction with rural practice. Rural health care providers are generally dissatisfied with their opportunities for participation in CHPE.

8. ***Partnerships involve the combining of expertise and resources. Partnerships are essential in the development and delivery of technology-based continuing health professional education (CHPE). Partnering enables the avoidance of duplication and allows organizations to share limited resources, equipment and infrastructure. CHPE providers need to partner with other organizations and communities in the development and delivery of technology-based CHPE programs to ensure program sustainability and acceptance. Municipal, provincial and federal levels of government have a role to play in encouraging, facilitating and supporting such partnerships.***

Partnering, whether that be with other organizations and institutions or other internal departments, appears to be a significant characteristic of technology-based distance education program development and delivery by Canadian CHPE providers. Building and strengthening a collaborative approach between institutions has the advantage of avoiding duplication and accessing a higher level of infrastructure and resources than would otherwise be possible. More importantly, it enables institutions to learn and grow from the experience of working together and to leverage important qualitative improvements and economies of scale (Bates, 2001). Partnership arrangements work best when partner institutions are of roughly the same status and have complementary strengths, that is, different areas of research or subject expertise that complement the other. The main advantage, besides cost, is that learners are able to access a wider range of expertise.

One model of partnering which appears to applicable to technology-based CHPE is that of 'consortia'. In a consortium model, different institutions share common resources (such as marketing, electronic and human networks, distance education expertise and learning centres), and agree among themselves to avoid duplication and to work together wherever possible on joint course development and delivery (Bates, 2001, p. 61). Successful consortia need funding mechanisms that reward and facilitate collaboration and they need a change of culture within organizations, from one of fierce competitiveness between institutions to one of trust and goodwill between the partner organizations.

9. ***Governments have an important role to play in stimulating efforts in the development and delivery of technology-based continuing health professional education (CHPE). Apart from funding to support the development and delivery of technology-based CHPE and appropriate technological infrastructure networks, there is a role for government to play in facilitating partnerships between institutions and organizations.***

According to Bates (2000) the roles of government in managing technological change in education and training can include the following: stimulator of 'best practices'; 'enabler, funder and broker of partnerships'; 'creator of technology networks'; and 'informer and protector of consumers'. Governments can also play a key role in articulating a collective vision with respect to the place of ICTs in health professional education and training. Information and communication technologies have a great deal of relevance in the enhancement of health care delivery in rural, remote and northern regions of Canada. Professional isolation is a key factor which influences the recruitment and retention of health professionals in these areas and a shortage of rural health care professionals is having a significant effect on the nature of health care services available in rural regions. Government can influence public policy decisions in this area by:

- enabling the delivery of cost-effective CHPE to rural and remote health professionals;
- increasing the capacity of organizations and institutions to utilize the power of technology to carry out their teaching, research, and service functions;
- enhancing a better conception of what constitutes best practice in the field of e-learning, distributed learning and distance education (Bates, 2001).

Strategies for the use of information and communications technologies in health services need to be embedded within a wider framework of government policy for health care delivery. At present, several countries are leading significant e-learning initiatives in the area of online CHPE. According to Bates (2000) governments may want to consider the establishment of different centres of excellence in different institutions, to ensure the development of programming for different market niches. Governments can also lever economies of scale, and concentrate scarce skills in developing and running e-learning programmes, by encouraging or building strong national consortia.

Dissemination of Findings

A Web page will be developed to highlight the results of this study. This report will be located in the research section of the Office of Professional Development Web site (www.med.mun.ca/pdmed). A number of key stakeholders in the continuing health professional education field will also be forwarded copies of the report. In addition to this, dissemination through presentations and posters to national audiences are planned at annual meetings such as the Association of Canadian Medical Colleges Annual Meeting in Quebec City, April 2003 and the Canadian Association of Continuing Health Education Annual Meeting in Halifax, Sept 2003. The results will also be adapted for publication in relevant academic and professional journals.

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Appendix A:
A Survey of Providers

Information and Communication Technologies in Continuing Health Professional Education (CHPE)

A Survey of Providers

Survey definitions:

Technology-based Distance Education
Technology-based Distance Education and/or Learning is defined as the use of information and/or communication technologies in the provision of instructional activities to adult learners who are separated from an instructor or institution by geography and/or time.

CHPE (Continuing Health Professional Education)
CHPE is defined as continuing health professional educational courses and/or programs which are directed to a health practitioner audience. For purposes of this survey, these programs may or may not be approved for continuing education credit as required by a licensure board, professional organization, or the workplace to maintain competence, retain licensure, certification, and/or employment.

Organizational Unit
Organizational Unit refers to the unit which has responsibility for the organization, planning and administration of continuing health professional education (CHPE) courses and/or programs.

Parent Institution
Parent Institution is defined as the main organization within which the unit operates or functions (e.g. University, Company, Corporation, Association).

Memorial
University of Newfoundland

Organizational Characteristics

1. **What type of organization do you work within? (Check one)**

- ☐ University
- ☐ Community college
- ☐ Provincial government department/agency
- ☐ Federal government department/agency
- ☐ Provincial health professional association
- ☐ National health professional association
- ☐ Professional society or college
- ☐ Pharmaceutical or communication industry
- ☐ Hospital/health care management board
- ☐ Other (please specify):______________

2. **Does your organizational unit provide technology-based distance education programming to health professionals?**

☐ Yes ☐ No If No, go to 15

3. **How long have distance education programs been offered by your organizational unit? (Check one)**

- ☐ Less than 1 year
- ☐ 1 - 5 years
- ☐ 6 - 10 years
- ☐ 11 - 15 years
- ☐ 16- 20 years
- ☐ More than 20 years

4. **What factors influenced your organizational unit's decision to offer technology-based distance education programs? (Check all that apply)**

- ☐ Part of organization's mission
- ☐ Increase revenue
- ☐ Address CHPE needs of rural/remote health professionals
- ☐ Increase opportunities for flexible CHPE access
- ☐ Address mandatory continuing education needs of health professionals
- ☐ Less expensive CHPE delivery modality *(e.g. less travel, time away)*
- ☐ Don't know
- ☐ Other (please specify): ______________

5. **How are your organizational unit's technology-based distance education programs supported? (Check all that apply)**

- ☐ Foundation or philanthropic grant
- ☐ Federal government grant
- ☐ Provincial government grant
- ☐ Professional association grant/subsidy
- ☐ Industry educational grant
- ☐ Parent institution grant/subsidy
- ☐ Tuition/Registration fees
- ☐ Alumni donations
- ☐ Don't know
- ☐ Other (please specify) ______________

6. Does your parent institution offer distance education courses?

☐ Yes
☐ No
☐ N/A (no parent institution)

7. Does your organizational unit have access to the resources (e.g. media production, instructional design) of a distance education division within your parent institution?

☐ Yes
☐ No
☐ N/A (institution does not have a distance education division)

8. Has your organizational unit formed partnerships with other departments, schools, businesses, or organizations for the purpose of sharing financial, human and/or technical resources for CHPE development and delivery?

☐ Yes
☐ No If No, go to 9

8a. Indicate the partnerships formed in your unit. (Check all that apply)

☐ other department(s) in your parent institution
☐ other educational institution(s)
☐ with business/industry
☐ with professional association(s)/societies
☐ with provincial government
☐ with federal government
☐ with community-based agencies
☐ other ______________________________
____

Types of Programs

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9. What types of technologies do you use in distance education? (Check all that apply)

☐ Correspondence materials *(e.g. print-based)*
☐ Web-based education *(e.g. subject matter on the Web)*
☐ Electronic mail (E-mail)
☐ E-mail List servs
☐ Computer conferencing *(asynchronous or synchronous)*
☐ Fax
☐ Videotapes
☐ Interactive videodiscs
☐ Audio cassette
☐ Interactive multimedia CD-ROMs
☐ Web broadcasts *(e.g. live video, audio and instructional material presentation)*
☐ Audio teleconferencing
☐ Audiographic teleconferencing
☐ Videoconferencing
☐ Cable/broadcast TV
☐ Radio
☐ Other (please specify) ________________
____
____
____

10. Are your distance education programs accredited by a provincial or national professional accrediting body?

☐ No
☐ Yes If Yes, please give the name of the accrediting body or bodies:

____

____

Faculty Support

---

11. Is formal training/support offered to faculty/instructors who provide distance education programs?

☐ No
☐ Yes If Yes, please specify (Check all that apply)

☐ Faculty development seminars/workshops
☐ Instructional development support materials *(e.g. manuals, textbooks, videos)*
☐ Instructional development Website
☐ Mentoring by experienced instructors
☐ One-on-one consultation with educational specialist
☐ Fellowships
☐ Bursaries *(e.g. conference fees, travel costs, professional development fees)*
☐ Teaching Award or other recognition
☐ Other ______________________________
☐ Other ______________________________

Target Audience

12. Who is the primary health professional audience(s) for your technology-based distance education programs? (Check all that apply)

- ☐ Family physicians
- ☐ Specialists
- ☐ Residents
- ☐ Registered Nurses
- ☐ Nurse Practitioners
- ☐ Licensed Practical Nurses
- ☐ Pharmacists
- ☐ Pharmacy Assistants
- ☐ Physiotherapists
- ☐ Physiotherapy Assistants
- ☐ Occupational therapists
- ☐ Occupational therapy assistants
- ☐ Social Workers
- ☐ Other ____________________

13. Where is the audience to whom you provide distance education? (Check all that apply)

- ☐ Regional
- ☐ Provincial
- ☐ National
- ☐ International

13a. What percentage of the learners participating in your distance education programs during the past 12 months were national and/or international?

National (Check one)

- ☐ 0%
- ☐ 1 - 25%
- ☐ 26 - 50%
- ☐ 51 - 75%
- ☐ 76 - 100%

International (Check one)

- ☐ 0%
- ☐ 1 - 25%
- ☐ 26 - 50%
- ☐ 51 - 75%
- ☐ 76 - 100%

14. What are the general characteristics of the health professionals who participate in your distance learning programs?

Predominantly recent university graduates (< 5 years experience)	☐ Yes	☐ No
Predominantly rural practitioners (population < 10,000)	☐ Yes	☐ No
Predominantly urban practitioners (population > 10,000)	☐ Yes	☐ No
Even mix of both rural and urban	☐ Yes	☐ No
Require CHPE credit to maintain licensure	☐ Yes	☐ No

Organizational Influences

15. For each of the following, give your opinion using the scale:

1 = Very poor, 2 = Poor, 3 = Can't say or no opinion, 4 = Good, 5 = Very good

	Very Poor	Poor	Can't say, or no opinion	Good	Very Good
The vision within my organization for technology-based distance education is...	1	2	3	4	5
The support from the leaders in my organization for technology-based distance education is...	1	2	3	4	5
The readiness to change among the people in my organization when it comes to the use of technology-based distance education is...	1	2	3	4	5
The adequacy of my organization's technical infrastructure for technology-based distance education is....	1	2	3	4	5
The day-to-day support of technology-based distance education in my organization is...	1	2	3	4	5
The funding and incentives for technology-based distance education that are available in my organization are...	1	2	3	4	5
The experiences in the past that my organization has had with technology-based distance education have been...	1	2	3	4	5

Professional Influences

16. **For each of the following, indicate the extent to which you agree or disagree, using the scale:**

1 = Strongly Disagree, 2 = Disagree, 3 = I can't say, 4 = Agree, 5 = Strongly Agree

	Strongly Disagree	**Disagree**	**I can't say**	**Agree**	**Strongly Agree**
My peers and colleagues believe the Internet is an important tool.	1	2	3	4	5
In the professional field in which I work, many people are Internet users.	1	2	3	4	5
In the professional field in which I work, most people think that technology-based distance education is important.	1	2	3	4	5
Soon everyone will be using the Internet.	1	2	3	4	5
Distance learning is likely to contribute to the solution of learning-related problems relevant to the professional field in which I work.	1	2	3	4	5
It is my personal opinion that technology-based distance education will improve teaching and learning.	1	2	3	4	5

Strengths & Resources

17. **For each of the following indicate the extent to which you agree or disagree that each statement is a strength or resource to the use of technology-based distance education for CHPE. Please use the scale:**

1 = Strongly Disagree, 2 = Disagree, 3 = I can't say, 4 = Agree, 5 = Strongly Agree

	Strongly Disagree	**Disagree**	**I can't say**	**Agree**	**Strongly Agree**
A priority of my unit.	1	2	3	4	5
A priority of organization.	1	2	3	4	5
Administration supportive of the idea.	1	2	3	4	5
Sufficient administrative/clerical support staff.	1	2	3	4	5
Specialized staff to design the courses.	1	2	3	4	5
Experience in technology-based distance education.	1	2	3	4	5
Adequate budget for technology-based distance education programs.	1	2	3	4	5
Telecommunication costs are reasonable.	1	2	3	4	5
Adequate telecommunication infrastructure (e.g. bandwidth availability).	1	2	3	4	5
Adequate facilities/equipment for supporting distance education development and delivery.	1	2	3	4	5
Adequate faculty/subject matter expert support.	1	2	3	4	5
Convenient personal Internet access among target audience.	1	2	3	4	5

	Strongly Disagree	Disagree	I can't say	Agree	Strongly Agree
Convenient personal computer access among target audience.	1	2	3	4	5
Adequate level of computer experience among target audience.	1	2	3	4	5
Enthusiasm among target audience.	1	2	3	4	5
Organizational support from employers of target audience.	1	2	3	4	5
Sufficient time commitment for participation among target audience.	1	2	3	4	5

Information and Communication Technology CHPE Programming

18. Do you provide CHPE programs on the following topics? (Check all that apply)

☐ Using computers
☐ Using the Internet
☐ Using Web browsers
☐ E-mail applications
☐ Using search engines
☐ Literature databases *(e.g., Medline, CINHL)*
☐ Literature search strategies
☐ Electronic health records
☐ Practice management programs
☐ Spreadsheet/database software
☐ Hospital computer systems
☐ Patient education software
☐ E-journals/text books
☐ Presentation software *(e.g. Power Point)*
☐ Electronic drug databases
☐ Telemedicine/Telehealth
☐ Evaluating quality of Web pages for patient information referrals
☐ Keyboarding skills
☐ Statistics software *(e.g. SPSS, SAS)*
☐ other (please specify): ________________
☐ other (please specify): ________________
☐ other (please specify): ________________

19. What is your position title? ____

Thank you!!

Please return the survey in the attached postage-paid envelope.

Appendix B:
Facilitator's Guide to Online Conferencing

FACILITATOR'S GUIDE TO ONLINE CONFERENCING

September 2002

A COLLABORATION BETWEEN

UNIVERSITY OF
CALGARY

Office of CME
Faculty of Medicine

Memorial
University of Newfoundland

Office of Professional
Development
Faculty of Medicine

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The views expressed herein do not necessarily represent the official policy of Health Canada or other noted sponsors.

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Facilitator's Guide to Online Conferencing

What is the purpose of this Guide?

The Internet is an excellent tool to support communication between groups of people who find it difficult to meet face-to-face. Increasingly it is being used to support learning by providing a medium through which learners and instructors can interact. There are many Internet tools that can be used to support communication for learning online, including e-mail. This document provides background and guidelines for new facilitators of online learning through text-based asynchronous conferencing systems.

1. BACKGROUND ON ASYNCHRONOUS CONFERENCING

What is online conferencing?

Online conferencing software allows text-based messages to be sent to groups of users via the Internet. Unlike e-mail, messages are organized by topic and stored on a central computer so that any authorized user can access the messages at any time. Because users do not have to be online at the same time to interact, it is called **"asynchronous"** conferencing (as opposed to "synchronous" or real-time interaction).

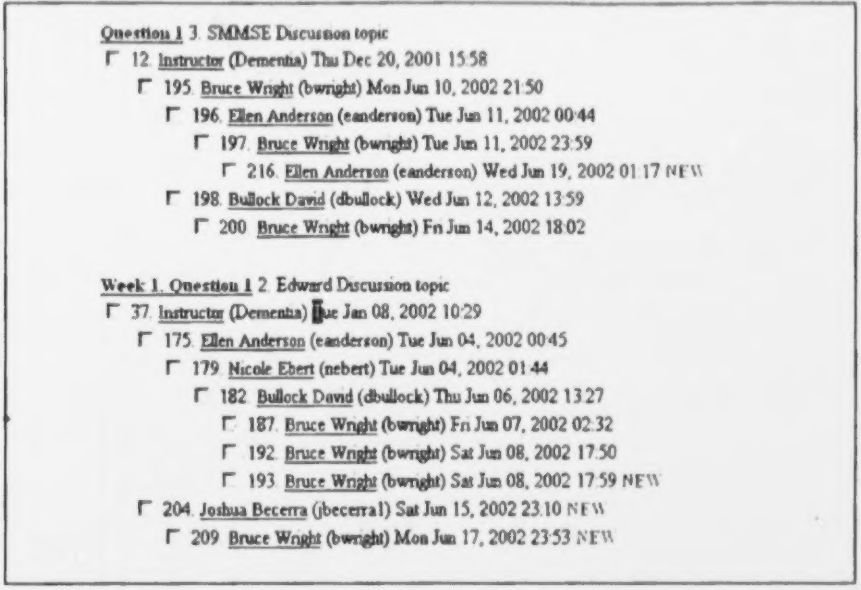
Some conferencing systems are accessed through Internet web sites using a standard web browser such as Internet Explorer or Netscape (e.g. WebCT, WebBoard). Other conferencing systems require each user to install special application software that is used to communicate with the host computer via the Internet (e.g. FirstClass). These conferencing systems tend to have more features than browser-accessed conferencing systems.

What does an online discussion look like?

In most conferencing systems, messages are usually organized by topic or **"thread"**. Replies are often **"nested"** – they appear indented below the message to which they belong (see Example 1, below). Most conferencing software allows the user to view the discussion messages as **"threaded"** (arranged by topic) or chronological (unthreaded). When there are multiple topic threads within a discussion, a threaded view gives the user a better idea of how the discussion on each topic is developing.

In Example 1 below, "**Question 1** 3. SMMSE Discussion Topic" is one topic or thread in this conference. Replies to this message are indented (e.g. Message 195 – Bruce Wright). Replies to replies (e.g. Message 196 – Ellen Anderson) are further indented. This creates an overall visual structure for the conference that provides some indication of the order in which the discussion is building. Typically, the conferencing software has a way of alerting a participant to new messages that he/she has not yet read (e.g. messages marked NEW below).

Example 1. Typical threaded discussion with nested replies



Question 1 3. SMMSE Discussion topic

- ☐ 12. Instructor (Dementia) Thu Dec 20, 2001 15:58
  - ☐ 195. Bruce Wright (bwright) Mon Jun 10, 2002 21:50
    - ☐ 196. Ellen Anderson (eanderson) Tue Jun 11, 2002 00:44
      - ☐ 197. Bruce Wright (bwright) Tue Jun 11, 2002 23:59
        - ☐ 216. Ellen Anderson (eanderson) Wed Jun 19, 2002 01:17 NEW
    - ☐ 198. Bullock David (dbullock) Wed Jun 12, 2002 13:59
      - ☐ 200. Bruce Wright (bwright) Fri Jun 14, 2002 18:02

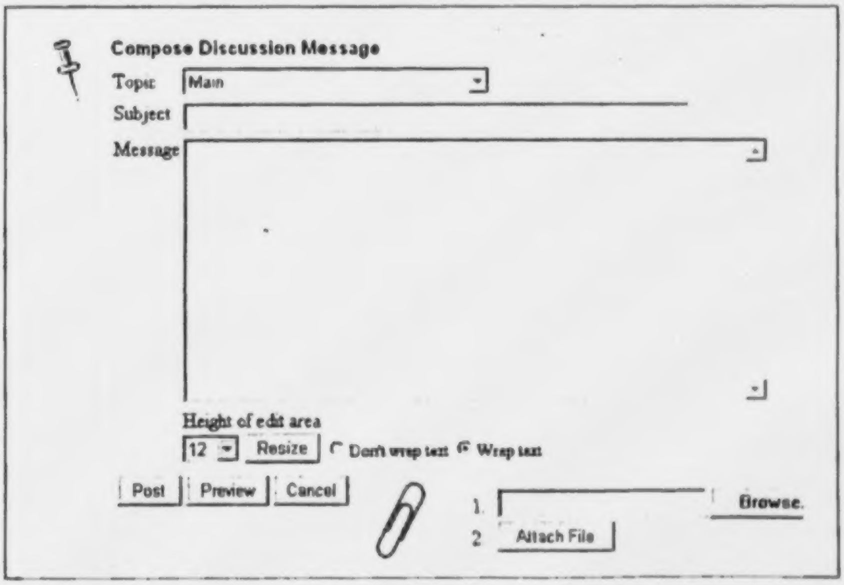
Week 1, Question 1 2. Edward Discussion topic

- ☐ 37. Instructor (Dementia) Tue Jan 08, 2002 10:29
  - ☐ 175. Ellen Anderson (eanderson) Tue Jun 04, 2002 00:45
    - ☐ 179. Nicole Ebert (nebert) Tue Jun 04, 2002 01:44
      - ☐ 182. Bullock David (dbullock) Thu Jun 06, 2002 13:27
        - ☐ 187. Bruce Wright (bwright) Fri Jun 07, 2002 02:32
        - ☐ 192. Bruce Wright (bwright) Sat Jun 08, 2002 17:50
        - ☐ 193. Bruce Wright (bwright) Sat Jun 08, 2002 17:59 NEW
  - ☐ 204. Joshua Becerra (jbecerra1) Sat Jun 15, 2002 23:10 NEW
    - ☐ 209. Bruce Wright (bwright) Mon Jun 17, 2002 23:53 NEW

How do you add a message to a discussion?

Submitting a message to a discussion is called **"posting"**. Most conferencing systems allow you to either reply to an existing message, or post a new message within a discussion topic. Typically users type their message into a message composition box or screen (see Example 2, below). There is a chance to preview what the posting will look like in order to check for errors. Users can attach files or insert images or links to web pages into conference messages.

Example 2. Message composition box in a browser-accessible conferencing system.



Compose Discussion Message

Topic: Main

Height of edit area: 12

○ Don't wrap text ● Wrap text

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What are some of the advantages of asynchronous conferencing?

Online text-based conferencing has developed into an important instructional medium that offers significant advantages over face-to-face discussions. In particular, professional groups striving for more egalitarian relationships in group discussions are well-served by online conferencing. Traditional hierarchies and relationships (e.g. between instructor and student) are difficult to maintain because social and contextual cues that influence group behaviour in face-to-face settings are lacking. Participants usually feel freer to express views and share experiences and thoughts as long as the conference environment is non-judgemental. Authority and control of the discussion can more readily shift to participants as they become more experienced and comfortable in the online environment.

- ➢ **Because the discussion is accessed through the Internet:**
    - experts can be brought into the discussion from anywhere in the world
    - links to Internet resources that extend learning can be embedded into discussion messages

- ➢ **The asynchronous nature of the discussion is advantageous because:**
    - there is no waiting to contribute to the discussion or ask questions
    - everyone has an equal chance to contribute
      Participants who are shy or intimidated by the pace of face-to-face discussions find it easier to contribute to online discussions.
    - facilitator and participants have time to think before replying or contributing
      This opportunity for reflection is considered a major strength of online communication
    - facilitator has time to choose a moderating strategy that will help discussion develop and avoid "knee-jerk" reactions to comments made during a verbal discussion

- ➢ **Text-based discussion is an advantage because:**
    - messages are "neutral", providing no visual cues to potentially discriminatory features of participants (e.g. age, sex, race, physical disabilities)
    - participants usually take time to organize their thoughts before writing
      Contributions tend to be more thoughtful and clear than spontaneous remarks made in the heat of a verbal discussion.
    - a transcript of the discussion is maintained
      Participants can continually revisit and reflect on ideas presented. They can pick out threads of ideas emerging from the discussion and relate emerging themes in different ways to deepen understanding of the topic.
    - praise and constructive critique are public and thus more effective
    - it is difficult to hide nonparticipation or fake meaningful contributions to a discussion
    - topic-based organization of online conferences makes it easier to follow multiple conversations at once

What are some of the disadvantages of online conferencing?

Disadvantages to online conferencing can be overcome with skilful facilitation. More detailed guidelines to facilitation are provided later in this document.

- **Asynchronous nature of the discussion means:**
  - when participants log on infrequently, it can take a long time for a meaningful discussion to evolve (and to correct misunderstandings)
    Facilitators need to be clear at the beginning about the level of participation expected.

- **Text-based discussion can be a problem because:**
  - lack of visual cues to meaning can lead to misunderstanding, especially with use of humour or sarcasm
    It is best to avoid subtle humour or sarcasm, unless you can make it obvious what you are trying to do.
  - social and contextual cues that regulate and influence group behaviour are lacking
    They must be created through the course structure and early dialogue. Also, lateness, rudeness or inconsistency in response to others, especially on the part of the facilitator, is less easily forgiven.
  - mistakes are public, which can inhibit free sharing of experience and ideas
    It is important to remain supportive and nonjudgemental to encourage participants to take the risk of committing their ideas to a written, semi-permanent format.
  - it is easy for participants to drop-out or leave a conference unseen
    Facilitators need to follow-up promptly with participants who appear to have dropped out.
  - participants find it easy to "lurk" or "browse" – read messages without contributing to discussion
    This is normal and may or may not need to be dealt with. As with face-to-face discussions, 1/3 of the participants will contribute most of the messages, 1/3 will contribute occasionally, and 1/3 will rarely contribute after their introductory message.

2. PREREQUISITE KNOWLEDGE/SKILLS FOR FACILITATORS

Do facilitators of online discussions need special skills?

First-time moderators mainly need interest and enthusiasm in their task, and a willingness to learn new skills associated with online conferencing. Here are a few things to think about:

- **Personal characteristics of successful moderators include:**
  - willingness to adapt existing facilitation skills and learn new skills associated with online conferencing
  - experience with facilitating learning through small group discussion is helpful but not essential
  - courteous, polite, respectful in online written communication (e.g. e-mail)
  - ability to organize ideas for written or verbal communication is an asset

➢ **Advanced computer knowledge/skills are not necessary. It is helpful to have:**
- some computer experience, including some Internet skills
- reasonably good keyboarding skills because all communication is written
- reliable Internet access although high speed access is not required
- experience and confidence with e-mail communication

What technical knowledge is needed?

First-time moderators should have an understanding of the basic structure of online conferencing (see above). They should also have some basic knowledge of the conferencing system used in the course.

➢ **Practise with the conferencing system before the course begins to gain experience and confidence. Know how to:**
- log in
- find the discussion board or conferencing area
- select a discussion to review
- read messages – old and new
- reply to a message
- post a new message
- start a new thread
- start a new discussion topic or conference
- move between discussions
- arrange/rearrange messages in a discussion (e.g. mark unread, view messages threaded or unthreaded)
- insert images or Internet links into a message
- delete or move messages posted by a participant into the wrong area (if allowed by the conferencing system)
- monitor participant activity through the software

Do facilitators need to be experts in the topic under discussion?

Online facilitators do need not be recognized experts. However they should be confident in using content knowledge at the level presented in the course, and have experience in the topic area to share.

➢ New facilitators should read through course materials prior to starting the course.
- note how online discussions are intended to support learning through the course.
- be familiar with the learning goals of each discussion
  Develop a mental image or concept of what participant discussion should look like when the goals of the discussion have been achieved.

- Draft an opening or introductory message for each course discussion that provides guidance to learners about what is expected from that discussion.

3. FACILITATOR ROLE IN ONLINE CONFERENCING

What is the facilitator's role in an online discussion?

The facilitator has three main responsibilities or roles in an online discussion. Every facilitator contribution to the discussion should have a purpose that relates to one of these roles. Some facilitator postings will serve more than one purpose.

➢ **Social** – Like a face-to-face discussion, the social context of an online conference provides a framework for productive learning. By attending to social aspects of the conference, facilitators can build an environment where participants feel comfortable, respected, and willing to take risks to build new content knowledge.

- Virtual counterparts to widely understood face-to-face social rituals such as greeting and chatting must be created through text-based dialogue.
- Protocols for acceptable online communication are both modelled by the facilitator and made explicit through instructions to participants.
- The social role is most evident at the early stages of a course or conference. However, it continues throughout the course to maintain a friendly, comfortable environment that invites participation.
- An introductory activity that is more social than content-oriented should be included at the beginning of the course.

➢ **Managerial/Organizational** – Like a face-to-face discussion, the facilitator uses a variety of techniques throughout the conference to set a direction and timetable for the discussion, keep the discussion moving, and deal with problems that threaten group cohesiveness.

➢ **Intellectual** – In both face-to-face and online discussions, the role of a facilitator in small-group learning is to promote critical reflection and personal knowledge building by participants. This is most effectively accomplished using strategies that guide and encourage learners in their efforts to achieve course objectives. To achieve a balance between an instructor-centered and learner-centered teaching style, a facilitator:

- encourages learners to actively explore course content and broaden and deepen their understanding through dialogue
- uses participants' comments, ideas and insights to advance the discussion rather than interjecting with expert knowledge
- tries to clarify and extend the thinking of others rather than giving the "right answers"
- encourages interaction between participants, rather than through the facilitator

How does a facilitator decide what role to play?

Facilitators determine what is needed by the stage of the course and discussion, the frequency of postings, and the content of developing discussion relative to the goals of the activity. The main stages through which learners and discussions progress in the life of an online course are:

- **Stage 1: Getting Started**
    - The learner is able to log into the course and has enough motivation and confidence to post an introductory message.
    - This stage ends with each participant's first posting.
    - The facilitator's role is mainly social – creating a welcoming, secure environment with sufficient motivation for participants to join the first discussion.
    - An introductory activity that is primarily social is a low-risk way for learners to get started.
- **Stage 2: Socialization**
    - Learners gain experience with the online environment and begin to develop a sense of community with the group mainly through social messaging.
    - This stage is best accomplished through an introductory activity that is primarily social in nature.
    - This stage ends with the first content-related postings.
    - The facilitator's role is mainly social. Some organizational messaging is needed to create a transition to more content-focused discussion.
    - It is helpful to include in the course an introductory activity to promote socialization
- **Stage 3: Information Exchange**
    - In the early stage of content-related discussion, learners develop a sense of direction for the discussion. They begin to interact with course content and other learners.
    - The facilitator continues to use social messaging strategies to maintain an open, friendly, inviting learning environment. Organizational strategies are used to keep content-related discussion moving.
    - As the discussion progresses, the facilitator uses a variety of intellectual strategies to encourage participants to actively use course content to develop new knowledge.
- **Stage 4: Knowledge Construction**
    - In the later stage of content-related discussion, learners integrate new content with existing knowledge, refine ideas, and widen their perspective. The goals of the discussion activity are largely achieved during this stage.
    - The facilitator uses intellectual strategies to promote critical reflection and deep learning. Organizational strategies are used to keep the discussion on track, close unproductive discussions or open new discussion topics as needed, and summarize as discussion goals are reached. Problems that threaten productive discussion are managed using social strategies.
    - Many participants and/or discussions will end at this stage.

- **Stage 5: Personal Development**
  - This stage occurs towards the end of a course. Learners move beyond course material independently to further develop personal knowledge.
  - Learners have little need of a facilitator at this point. However the facilitator can support this process by referring learners to other resources as necessary. This may include embedding links to Internet resources in their messages.
  - Some learners will not make it to this stage during a course. This is normal.

4. SUGGESTED FACILITATOR ACTIVITIES AND TECHNIQUES

Before the course begins . . .

- **Gain prerequisite knowledge and skills (details above)**
  - review the course materials
  - practice using the conferencing software
- **Send an e-mail message to each registered participant**
  - welcome participants to the course (social)
  - remind learners of official course start date (managerial)
  - encourage learners to log on early after the course start date (managerial)
  - provide log-in instructions e.g. link to course web site, log-in procedure, passwords if necessary (managerial)
  - provide contact information for technical support including e-mail address and phone number (managerial)
  - encourage learners to print off log-in instructions, passwords, technical support contact information for future reference (managerial)
- **Post a welcoming message in an easy-to-find location in the course discussion area before learners are expected online**
  - the message creates a welcoming presence when participants start to arrive (social)
  - use a friendly, welcoming, personal tone that invites participation (social)
  - model good messaging technique to establish norms for the course (social)
    - use a subject heading that clearly reflects the content of your message
    - use a messaging style that is half-way between the informality of spoken language, and the formality of written communication
    - maximum one screen of information
    - be polite and respectful
  - offer support to those who need it – it is reassuring for learners to know that a feeling of insecurity at this stage regarding their ability to participate is common

> *e.g. "You might be feeling a bit uncomfortable at this stage – not sure exactly how to use the conferencing system or what to say. This is normal! The best way to get over this is to jump right in. If you encounter technical problems, contact the Help Desk at . . . ."*

- encourage participation by indicating how they will benefit from the introductory activity (managerial)

> *e.g. "The first activity is an 'ice-breaker' discussion. This is your chance to meet other members of the group. It is also a good place to practice some of the messaging techniques you will use in the course – posting new messages, responding, maybe even embedding a link in your message (do you have a personal website you would like us to visit?)."*

- offer guidance on what to do next (managerial)

> *e.g. "Open the Introductions discussion to meet me. Introduce yourself to the group by posting a message that tells us something about your work, but also share something personal e.g. interests, family/pets, an anecdote. Reply to someone else's introduction to keep the 'conversation' going."*

- provide guidelines on what level of conferencing activity is expected in the course (managerial)
  The optimal frequency of participation depends on the length of the course and/or individual discussion. The shorter the discussion period, the more frequently participants should be logging on. It is not unreasonable to expect participants to log-on at least every 2 days in a short timeline (e.g. 1-2 week) discussion.

> *e.g. "To create momentum in our discussions throughout the course, it is best if you log-in every (day, two days, etc.). If the discussion is really active, you might have to log-in more often to keep up."*

➢ **Post a personal introduction in an "Ice-Breaker" or Introductions conference**

- an ice-breaker conference invites participants to make their first postings in a low-risk situation (social)
- share professional as well as personal information (e.g. interests, hobbies, family/pets, an interesting anecdote) to begin building a sense of community (social)

> *e.g. "By day I . . . . . By night I'm a fitness junkie - walking, running, hiking, tennis, squash, cycling, sailing - you name it, I'll try it!"*

- encourage participants to comment on or respond to the introductions posted by colleagues to immediately establish the expectation of interaction (social)

> *e.g. "As your colleagues begin to introduce themselves, let them know you are 'listening'. If you were milling about waiting for the course to start, how would you reply to their brief introduction?"*

During the introductory activity . . .

- **Reply as soon as possible with a welcoming message after each participant's first post**
  - reassures the learner that someone is "listening" (social)
  - use the participant's first name in your reply to make a personal contact, keep the environment friendly, and signal a norm that will be used throughout the course (social)
  - respond to something shared in the participant posting to encourage further dialogue (social)
- **Post messages that encourage participants to "mingle" e.g.:**
  - create a message that invites conversation on a neutral, universal topic e.g. weather, vacations, sports rivalries (social)
  - create a message that links two or more participants through commonalties noted in their introductions (social)
- **Respond to technical questions or problems immediately**
  - technology problems, especially at an early stage, significantly impair motivation to participate
    Refer the participant to the Help Desk or technical support if necessary. (managerial)
- **Review participant logs regularly**
  - try to identify participants who have either not logged on to the course, or those who have logged on but who have not contributed an introductory message (managerial)
- **Use private e-mail to contact participants who are not online or who have not posted a message by the time the introductions conference is more than half over**
  - the longer participants delay starting the course, the more difficult it is for them to feel a sense of community with the group (social)
  - support the participant who has a legitimate reason for not participating (e.g. may have lost their password, have computer problems, or be experiencing family or personal crisis) (social)
- **At the end of the introductory discussion post a message to create a transition to the first content-related discussion (managerial)**
  - invite further chat or social messaging to continue in a virtual "coffee break" discussion that is established for this purpose (social)

In the first content-related discussion . . .

- **Post an opening message that sets expectations for discussions throughout the course (managerial)**
  - explicitly state what your expectations are for content-related messaging (social):
    - always use a subject heading that reflects content of the message

  - no more than one screen in length if possible - short and to-the-point is preferred to long and rambling
  - discussion-like style somewhere between informal conversation and more formal written communication
- remind participants that they are expected to respond to messages posted by other members of the group (intellectual)
  They should refer to colleagues by name and refer to their statements and ideas often.
- affirm your role as a "guide on the side" (intellectual)

> *e.g. "This course is about you developing your own personal understanding of . . . . - not about me giving you the "right" answers. It will be your comments, your ideas, and your insights that will move the discussion ahead. I encourage you to find your way as a group - rely on the knowledge and experience of your colleagues, rather than looking for an 'expert' opinion."*

At the beginning of a content-related discussion . . .

➢ **Post a message before participants are due to arrive that sets expectations for the discussion**

- state the topic and desired outcomes of the discussion (managerial)
- remind participants of any supporting coursework needed for the discussion (managerial)
- remind participants of expectations regarding group discussion, if necessary (above) (intellectual)
- pose an opening question or issue to stimulate discussion (intellectual)
  This should be an open-ended question for which there is no set answer that can be gleaned directly from the readings. It should be an issue that will invoke different points of view or controversy. It should not be answerable with a single response from one participant.

➢ **Wait until two or three messages have been posted before responding. Respond with a message that acknowledges the previous contributions and invite further discussion.**

- facilitator should contribute only 25 to 50% of the comments (managerial)
  At the beginning of the discussion or course, the proportion will be higher to stimulate discussion. Towards the end of the discussion or course, the proportion should be much lower.
- trust is established by affirming and confirming the value of each participant contribution without responding to each comment as it is made (social)
- acknowledge individual contributions by naming names and citing phrases or ideas from the posts of different participants (social)
- encourage learners to respond to each other by inviting response to a specific point(s) made by a participant(s) (social)

➢ **Use different messaging strategies to guide the discussion as necessary (intellectual)**

- focus the dialogue by listing key ideas and contributions from the discussion and commenting on the connection between them
- clarify the direction of the discussion by highlighting important ideas from participants and posing questions or raising issues that will move the discussion in the desired direction
- when multiple solutions to a problem are presented, help the group focus on the most important or valid ideas
  Cite the participants' perceptions of relevance or importance if possible to avoid imposing an external "expert" view. (social)
- consider rephrasing and readdressing questions to the group questions that were posed to you as the "expert" (social)
- clarify concepts that have been omitted, misconstrued or overemphasized in the discussion (intellectual)
  If possible, point to comments that have been made that have elements of the correct understanding as a basis for the clarification. (social)
- refer learners to course materials as necessary

➢ **Maintain an atmosphere of trust (social)**

- model non-judgemental response to participant postings
  Fear of ridicule or criticism will inhibit participation.
- reinforce desirable online protocols by publicly recognizing effective online behaviour and tactfully redirecting poor behaviours (e.g. language that is vulgar, condescending, hostile, inflammatory, racist or sexist; comments that are not respectful of others' opinions, beliefs, and values; critical or judgmental comments directed to an individual)
- use private e-mail to suggest a change in an individual's recurring poor online behaviour
- ask for clarification if the intent of a message isn't clear
  Sarcasm and humour are difficult to use online and can be easily misinterpreted. Misunderstandings take a long time to fix online and can impair productive discussion.
- defuse potentially emotional situations by using a neutral tone to focus on the important ideas

➢ **Use "housekeeping" strategies as necessary to ensure messages remain on topic (managerial)**

- move misplaced contributions if allowed by the conferencing system
  Inform participants about why the comment was moved.
- refer inappropriate digressions to another thread or guide participants back to the main topic
- start new topics or threads within a discussion as necessary, or initiate new discussions to deal with important ideas or issues that arise during the course

➢ **In fast-paced discussions, summarize often to keep participants on track and help them cope with the large number of messages (managerial)**

In a maturing content-related dialogue . . .

- **Be prepared to allow participants to control the discussion if it appears they are meeting the learning objectives**
- **Use different strategies to promote reflection and a deeper understanding of the topic (intellectual)**
  - encourage participants to clarify their reasoning
  - encourage participants to examine their beliefs, assumptions and potential biases or preconceptions that underlie their responses
  - question the relevance of certain ideas or issues to identify those worth discussing further
  - weave together seemingly unrelated ideas or thoughts that may suggest alternative valid interpretations or lines of thinking
  - identify lines of thought that do not deepen the discussion, but may serve as a source of comparison or alternative viewpoints later in the discussion
  - use participant insights as a bridge to the next level of understanding
  - encourage fresh approaches to a problem by identifying positions that have been taken and challenging participants to seek alternative interpretations or solutions
  - model reflection by highlighting or paraphrasing insightful comments made by participants then reflect on what those might mean
  - model personal reflection in the discussion by critically examining your own beliefs around central issues or dilemmas
  - redirect discussion away from defence of hardened positions toward acceptance of multiple perspectives
  - introduce alternative perspectives into the discussion by using stories or situations gleaned from personal experience
  - look for evidence of knowledge construction and acknowledge it

At the end of a content-related discussion . . .

- **Post a summarizing message to bring closure to the discussion (managerial)**
  - cite recent participant postings to illustrate how the learning goals of the discussion have been met (social)
  - include some bridging comments to move participants into the next discussion (managerial)

At the end of the course . . .

- **Post a final summarizing message to bring closure to the course (managerial)**
  - reflect positively on learning evident through the discussion activities
  - remind participants of any required post-course activities

5. STRATEGIES FOR IDENTIFYING AND MANAGING POTENTIAL PROBLEMS

Lurkers/browsers

Refers to learners who read messages but do not contribute. Because "lurking" has a pejorative connotation, "browsing" is often used as an alternative term.

➢ **Lurking is normal**

- like face-to-face discussions, online 1/3 of the participants will contribute most of the messages, 1/3 will contribute occasionally, and 1/3 will rarely contribute after their introductory message
- 3 types of lurkers
  1. lack skills or confidence to participate. This is common in early stages of the course or discussion.
  2. getting used to the norms and ways of communicating online. They will start to contribute when they feel comfortable.
  3. learning from the discussion and feel no need to participate. Other learners may feel resentful of those who are not actively participating.

➢ **Use the activity log to discover lurkers**

- look for learners who are logging into the course and reading discussion messages, but who have not posted messages to the discussion

➢ **Suggested strategies for dealing with lurkers/browsers**

- contact registered participants who have not posted their first message to determine if there are technical problems
  Try private e-mail first. Phone contact may be necessary to identify participants who are having computer problems.
- use private e-mail later in the course to follow-up on participants who have stopped contributing
  Be non-judgemental – if they are satisfied with their learning that is all that is important.
- give participants time to feel comfortable with the online conferencing environment.
- give learners a reason to participate by ensuring the purpose of the discussion is clear and that it is a valuable, meaningful part of the course
- give learners a reason to participate by opening up alternative directions for the discussion to take
- avoid lecturing
  Learners will stop discussing if they know the instructor will give them all the answers.
- check all the discussion groups. A learner may be active in one but not all.
- critical mass of participants (usually 6 to 15) is needed to generate enough discussion to keep learners engaged.
- define a minimum level of participation required for successful completion of the course (e.g. one message per discussion that shows a thoughtful level of engagement with the course material)
  This is controversial among both learners and instructors.

Drop-outs

Refers to learners who stop logging into the course.

- **Use the activity log to discover drop-outs**
  - Look for learners who have not logged-in to the course for an unusually long period
- **Suggested strategies for dealing with drop-outs**
  - use private e-mail to contact drop-outs and determine what is needed to get them back in the course
    They may be experiencing technical problems, a family or personal crisis, be on vacation, or may have issues with the course that need to be addressed.

Late-comers

Refers to learners who join the course or discussion after it is well-established. Late-comers can be very disruptive because they are perceived as a "stranger". Often they do not contribute at the same level as more experienced participants.

- **Acknowledge the late-comer's first posting publicly**
  - welcome the late-comer to the discussion
  - encourage the late-comer to post introductory comments in the appropriate conference, then encourage others to go there to "meet" the late-comer.
  - weave their comments into existing dialogue if possible
- **Use private e-mail to suggest to the late-comer strategies to catch up with progress in the course and/or discussion**
- **If the late-comer has missed a substantial portion of the course, it might be wiser to withdraw**
  - establishing minimum standards for successful completion of the course will make it easier to recommend withdrawal

Monopolizers

Occasionally one or two people may dominate a discussion. This can prevent others from participating and lead to feelings of resentment.

- **Suggested strategies for dealing with monopolizers**
  - acknowledge contributions made by the monopolozier, then tactfully suggest giving others a chance to participate

    e.g. "Let's hear from some of the others on this issue."

  - Direct questions to specific members of the group who haven't been participating

e.g. "What happens in your practice _____?"
"What is your experience with this _____?"

- Resist using private e-mail to deal with monopolizers. They may be offended and stop contributing altogether.

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Appendix C:
Best Practices Document in Distance Education

Best Practices Document in Distance Education

Summer 2002

A COLLABORATION BETWEEN

zeddcomm

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1.0 Introduction

Throughout the history of human communication, advances in technology have powered paradigmatic shifts in education. The challenge faced by many educators today is how to provide individuals with increased educational opportunities in this environment of rapid technological change. Moving away from traditional instruction and moving toward the development of quality distance education programs can assist many organizations in overcoming any problems they feel they may have incurred through previous training ventures.

Distance learning can bring enormous efficiency and effectiveness gains to an organization. The question then for many individuals is how to justify the initial investment and ensure that learning is closely aligned with the business goals established by that organization. In other words, to make learning as effective as possible in this delivery mode, it is important to build a strong business case. Before one can really set this in motion, however, it is important to first understand the components of distance education.

1.1 What is Distance Education

The terms distance education and distance learning have often been used interchangeably. The hallmarks of both are:

- The separation of facilitator and learner in space and/or time
- The control of learning by the learner rather than the distance facilitator
- Noncontiguous communication between facilitator and learner mediated by print or some other form of technology

Despite the similarities between the two, there is an obvious difference that needs to be clarified. Institutions and facilitators control educational delivery, or distance education, while the learner is responsible for the actual learning. In other words, distance learning is the result of distance education.

Distance Learning

Distance learning is a formal educational process that breaks the mold of the traditional classroom. There are two key differences between traditional learning and distance learning. Distance learning adds flexibility and availability, regardless of time, place, or pace of learning.

Distance Education

Distance education is a form of instructional delivery that does not require the learners to be physically present in the same location as the instructor. Some of the defining elements of distance education are:

- The separation of facilitator and learners during the majority of the instructional process
- The use of educational media to unite the facilitator and learners and carry the course content
- The provision of two-way communication between the facilitator and the learners

In Practice

The need for access to affordable and convenient education has caused institutions to continually strive to find ways to reach out to students whose educational requirements are not met in traditional brick and mortar academic institutions. Since the development of correspondence courses, distance education programs have evolved significantly. Many innovations have been tried and, as technology develops, new methods are continually being instituted. Today, distance education includes audio, video and computer technologies. Currently, the most popular media are computer-based communication, telephone-based teleconferencing, and videoconferencing. These will be detailed later in this document.

1.2 Theories of Distance Education

When it comes to distance education it is important to remember that, like traditional education, it too has a strong theoretical foundation. All forms of learning have to rely on instructional models to ensure that the learners are able to make sense of the information presented and have the ability to construct new knowledge from what was presented to them. When it comes to actually designing learning today and ensuring that it is instructionally solid, there are really two main opposing views: symbol processing and situated cognition.

Symbol Processing/Information Processing Approach

The dominant view has always been the traditional information processing approach, which is based on the concept of a computer performing formal operations on symbols. Basically, the facilitator transmits a fixed body of information to learners via an external presentation. An abstract idea is presented as a concrete image and this image is then presented to the learner via some medium. The learner takes this information and then perceives, decodes, and stores it in their memory. The learners' context and mind are very important to their interpretation of the presented information. The end result is that the learner will develop their own image and use this to construct new knowledge based on their prior knowledge and abilities.

Situated Cognition

The alternate, which is steadily gaining popularity especially for adult learners, is tied closely to constructivism and is known as situated cognition. In this theory, the learners actively construct their own knowledge by interacting with the material that is to be learned. Often, people will mention this in conjunction with problem-based or active learning. The idea here is that information or knowledge is not to be transmitted to an individual; they must become more involved in the process if true learning is to occur. Learners use generalizations to help transfer knowledge from one situation to another.

This theory gives meaning to learning and promotes the transfer of knowledge to day-to-day situations. It enriches the learning process by providing practical experiences of real situations. Learners are encouraged to do more than memorize factual information. They are encouraged to build their higher-level thinking skills. The learners and their environment are viewed as parts of a whole and, as a result, learning is inseparable from the individual and their environment.

Information Processing Theory Versus Situated Cognition

These two theories are clearly on opposite ends of the spectrum. Most instructional designers will start with the empirical knowledge: objects, events, and practices that mirror the real-life environment of their learners. A firm theoretical background will then allow them to develop a presentation that allows learners to construct their own knowledge by interacting with the presented information. It is generally the mainframe view that individuals learn much better when they are the active contributors in the learning process. The idea is to simulate the traditional classroom as much as possible while adding benefits the traditional classroom does not have the capabilities to offer. This is the reasoning behind the movement from instructor to facilitator. Instructor implies that someone is imposing knowledge upon the learners whereas facilitator seems to imply that the person is facilitating knowledge and assisting in the learning process. This is the movement distance education wants to advocate. There are no teachers and passive learners but rather facilitators and active participants.

In Practice

Theory provides a solid background upon which facilitators and designers can build their courses. While it is not necessarily at the forefront of their minds, they do adhere to a certain theoretical approach when they begin to structure the learning. Having knowledge about theory allows you to see on what side of the spectrum you fall and what exactly you want your learners to accomplish. Obviously, situated cognition is much more leaner centered than the other approach. In other words, the learners are more active and involved and as such as more likely to retain that knowledge.

1.3 Profile of the Typical Distant Education Learner

The primary role of the typical distance education learner is to learn. This task, in and of itself, requires a lot of motivation, planning, and an ability to analyze and apply the information that is being taught. Distance learning tends to be more intricate because of the variety of learners that participate in it. Learning becomes more complex because many distance education learners are older, married, have families, and are trying to maintain jobs. They have to try and coordinate all the different areas of their life to allow room for learning to actually occur.

Many of the learners have a variety of reasons for taking courses. Some are looking to earn a degree, some want to gain new knowledge, and for others it may be a job requirement. Learners are normally isolated from one another as well as from the facilitator, if there is even one. The motivation that arises from contact and competition with other learners is absent; in other words, the learners have to be self-motivated. The learners are also missing the direct contact with the facilitator and the ability to have that extra support. Lack of face-to-face contact with a real person may de-motivate some learners and lead to high attrition rates.

Technology is normally the means by which information and communication flow in the distance learning setting. All of the involved parties have to be familiar with the technology in order for it to work effectively. For distance learning to be successful, the learners have to undertake certain tasks:

- **Learners need to take responsibility for their own learning**. They need to be very motivated due to their limited interactions with both facilitators and learners. It is important to foster motivation in the learners by providing them with feedback, encouraging other learners to communicate with one another, and through email.
- **Learners need to become aware of their strengths and their limitations**. They also need to understand their own goals and objectives – why they are taking the course and what they expect to gain from the course.

As a general rule, distance learners are voluntarily seeking further education and thus they are indeed motivated. They tend to have post-secondary education goals, tend to be highly motivated and self-disciplined, and they tend to be older as well. This in and of itself does not guarantee their success. This is more likely to be determined by:

- Willingness to ask questions via email or discussion groups
- Possessing a serious attitude toward the courses
- Employment in a field where career advances can be readily attained through academic or upgrading job skills
- Previous completion of a college or university degree

In Practice

Teaching and learning at a distance is demanding. Learning will, however, be more meaningful and "deeper" for distance learners if the learners and their facilitator:

- Share responsibility for developing learning goals and objectives.
- Actively interact with class members.
- Promote reflection on experience.
- Relate new information to examples that make sense to learners.
- Maintain self-esteem.
- Evaluate what is being learned.

This is the challenge and the opportunity provided by distance education.

1.4 Delivery Methods in Distance Education

When choosing between different educational modes, it is important to carefully examine all the technologies and determine which one fits your teaching goal. If you are going to be developing several different courses, you may need to assess the characteristics and needs of the learning audience. You don't want to rely on one technology alone. With learning audience characteristics in mind, try to use a variety of platforms to address those needs.

Delivery Options in Distance Education

There is a wide range of options available to today's distance educator. They fall into four major categories:

1. **Voice**: This refers to instructional audio tools and it includes the interactive technologies of telephone and audio conferencing. Passive audio tools could include tapes and radio.
2. **Video**: Instructional video tools include still images such as slides, film, videotapes, and real-time moving images combined with audio conferencing (one-way or two-way video with two-way radio)
3. **Data**: This term is used to describe the broad category of instructional tools that rely on computers. Computer applications for the computer are varied and include the following:
    a. CAI (Computer Assisted Instruction): The computer is used as a self-contained teaching machine to present individual lessons.
    b. CMI (Computer-Managed Instruction): The computer is used to organize instruction and track learner records and progress. The instruction does not necessarily need to be delivered via computer but it is very common for CAI and CMI to be combined.

c. CME (Computer Mediated Education): This describes computer applications that facilitate the delivery of instruction and this includes e-mail, fax, real-time computer conferencing, and World Wide Web applications.

4. **Print**: This is considered to be the foundation element for distance education programs and it is truly the basis from which all other delivery systems have emerged. Print formats include textbooks, study guides, workbooks, course syllabi, and case studies.

In Practice

Which technology is best is dependent upon the purpose of the instruction. Technology is important in the delivery of distance education but even more important is the focus on instructional outcomes rather than the technology of delivery. The key to any successful educational program is its focus on its learners, the requirements of the content, and the constraints faced by the educator before selecting a delivery system. Each of the identified media has their own specific purpose. For example:

- A print component can provide most of the basic instructional content in the form of a course text as well as readings, course syllabus, and day-to-day schedule.
- Interactive audio or video conferencing can provide real-time face-to-face or voice-to-voice connection. This can be a great way to incorporate guest speakers and content experts.
- Computer conferencing or email can be used to send messages, assign feedback, and other targeted communications to one or more class members. It can also be used to increase interaction among learners.
- Pre-recorded videotapes can be used to present class lectures and visually oriented content
- Faxes can be used to distribute assignments, last minute assignments, to receive learner assignments and to provide timely feedback.

1.5 Key Players in Distance Education

Distance education involves a great deal of work; in fact, successful distance education is dependent upon the faculty, learners, facilitators, support staff, and administrators. These individuals are the key players and they all have certain roles and responsibilities in distance education.

The Learners

The learners are of the utmost importance when developing distance learning programs. The effectiveness of any good program is dependent upon whether it can meet the instructional needs of all the learners. The primary purpose for the learners is to learn and accomplishing this task can be very difficult. It requires motivation, planning, and an ability to analyze and apply the instructional content that is being taught.

Distance education adds new challenges because it is sometimes perceived as being impersonal due to the separation of individuals from one another. The only way individuals have to communicate is via technical linkages and this is the mechanism by which the gap is bridged between the participants.

The Faculty

The faculty develops the program and its success clearly rests with them. While in a traditional class the main tasks of the faculty are to assemble course content and understand learner needs, new challenges arise as a result of distance education. They must also:

- Understand the nature and philosophy of distance education.
- Develop an understanding of the characteristics and needs of distant learners with little first-hand experience and limited face-to-face contact.
- Adapt the teaching styles so that you can take into consideration the needs and expectations of diverse audiences.
- Design and develop interactive courseware to suit each new technology.
- Adapt teaching strategies to deliver instruction at a distance.
- Organize instructional resources in a format suitable for independent study.
- Receive training and practice in the use of telecommunication systems.
- Become involved in organization, collaborative planning, and decision-making.
- Evaluate student achievement, attitudes, and perceptions at distance sites.
- Develop a working understanding of delivery technology while still maintaining a focus on the teaching role.
- Function effectively as a skilled facilitator and content provider.

The Facilitators

The facilitators bridge the gap between the learners and the content. They ensure that the learners get as much from the information as possible by interacting with the material presented and tying this new knowledge into previously acquired information. They need to have a good understanding of the learners, their expectations, and the expectations of the course. They are core to the learning process because they help the learners interact and formulate new knowledge based on previously acquired information.

The Support Staff

The support staff ensures that all the details required to make the course run smoothly are met. They assist with learner registration, distributing and duplicating any new materials, textbook ordering, managing resources, and responding to emails or learner concerns. They are essentially the glue that holds the whole distance learning process together.

The Administrators

Finally, the last important group to mention is the administrators of the program. They are generally seen as the idea people but they are more than that alone. They are the consensus builders, the decision makers, and the referees between all those involved in the distance learning process. They work with support and technical staff to ensure that the resources are deployed effectively and that the instructional needs of the learners is never compromised in any way.

In Practice

Depending on the type of delivery method that is chosen, not all of these resources may be involved in creating and maintaining the materials to be developed. It is, important, however, to understand all the individuals that may have a role and the part they have to play in the distance learning process.

1.6 Effectiveness of Distance Education

The number one question that most people want addressed is whether distance education is as effective as traditional education. The answer is relatively easy and has less to do with the medium and more to do with the actual content that is being delivered. We place too much emphasis on the mode of instruction, which is important, but is not the determining factor in the success of a course. Similar to any form of instruction, distance education can be either good or bad. It is most effective when certain characteristics are met:

- The methods and technologies chosen are appropriate to the instructional tasks
- There is learner to learner interaction
- There is timely teacher to learner feedback

Other factors that need to take precedence in distance education are the:

- Learner characteristics and needs
- Influence of the media upon the instructional process
- Equity of access to interactive delivery systems
- New role of the learners and the facilitators in the distance learning process

What Constitutes An Effective Course

Research on distance education suggests that the most effective courses include the following:

- Constant and prompt feedback to the learner on assignments, questions, discussion and assessments
- Clear instructions for completion of work and criteria for assessment
- Discussions that link readings and lessons effectively
- Flexible use of a variety of media within the Internet and quality readings

1.7 Understanding the Costs of Distance Education

Another determining factor to many people in choosing distance education is whether it will cost more than traditional education so it is very important to weigh the costs versus the benefits to the learners. Several costs will factor into the design of a distance education program including:

- **Technology** - hardware (e.g., videotape players, cameras) and software (e.g., computer programs)
- **Transmission** - the on-going expense of leasing transmission access (e.g., T-1, satellite, microwave)
- **Maintenance** - repairing and updating equipment
- **Infrastructure** - the foundational network and telecommunications infrastructure located at the originating and receiving campuses
- **Production** - technological and personnel support required to develop and adapt teaching materials
- **Support** - miscellaneous expenses needed to ensure the system works successfully including administrative costs, registration, advising/counseling, local support costs, facilities, and overhead costs
- **Personnel** - to staff all functions previously described

While it would appear that there are high costs associated with distance education programs, there are also high costs associated with traditional education. Based on extensive research it has been found that despite the added costs, distance education is still 40 to 60% less expensive than the traditional classroom. The reason for this includes the elimination of travel expenses, lodging, facilities and supplies, and the reduced administration costs.

Justifying Training Expenses

Anytime you engage in any form of training you will be asked to justify the training investment in terms of its financial payback. In other words, you need to produce an accurate and defendable ROI or Return on Investment. In terms of the payback from the acquired skills, there is no difference between distance and traditional education. Financial calculations are based on the reduction in time taken to complete tasks, the ability to carry out tasks not possible before, or by increases in the quality of activities.

In terms of cost, there are major advantages over traditional education. The following factors need to be taken into consideration:

- The cost per person for the training is likely to be considerably lower.
- There will be no traveling and subsistence costs.
- The productivity lost from being away from the job is likely to be lower, especially if employees are willing to train outside work hours.
- The training time may be less given the ability to take just the required training modules.
- Little or no training administration is required depending on the approach.

The Kirkpatrick Model for Training

One of the best models for evaluating training is the Kirkpatrick model. Training is evaluated on several levels and each level of measurement depends on the previous level as well as the next.

The levels are as follows:

1. **Level One: What are the participants' reactions to the training and what do they plan to do with the material?**

   This can be easily measured through "smile sheets" - surveys or questionnaires that measure whether the training was meaningful and enjoyable.

2. **Level Two: What skills, knowledge, or attitudes have been changed or acquired with the training and to what extent?**

   Achievement tests measure how well the employee learned the information or skill presented.

3. **Level Three: Did participants apply what they learned in training to their jobs?**

   Observer ratings and observations measure the degree to which the employees apply what they have learned.

4. **Level Four: Did this on-the-job application produce measurable results?**

These results may include increases in productivity and efficiency, decreases in absenteeism, etc.

5. **Level Five: Did the monetary value of the produced results exceed the cost of training?**

   This is the actual measurement of the ROI. To calculate ROI, the formula is:

TACTP-TACNP=PNS

Subtracting the Total Administrative Costs of the New Program (TACNP) from that of the Total Administrative Costs of the Former Training Program (TACTP) gives the Projected Net Savings (PNS) for training administration. There are other related formulas that allow you to break down the costs and their benefits as well.

In Practice

Anytime a new training venture is initiated people will need to know whether it is a solid financial investment. Measuring training and calculating ROI allow you to determine whether you have made a rock-solid venture. It also allows you to build a strong business case for distance education.

1.8 Developing an E-Learning Business Case

When undertaking a new training venture, it is very important to develop a good business case for your new undertaking. A business case is very similar to a gap analysis. It describes the organization's current status versus the desired status and how the organization can achieve its goals. When a business case is well developed, it can support planning and decision making regarding purchases, vendor selector, and implementation strategies. It provides a clear statement of the business problem and an identified solution and it provides an opportunity to propose learning options that are based on objective data and offer an increased sense of understanding and ownership of effort.

The business case will identify the costs and potential return on investment of the new training venture when compared to alternate approaches. Internal research will need to be conducted looking at current training costs and estimated staffing needs.

A Sample Business Plan Framework

The following outline provides you with a framework for setting up a business plan.

Component	Description
Problem Statement	State the business problem that has rendered a need for training
Background	Include information regarding skills, budgeting, and performance which contribute to the business problem
Project Objectives	State what the solution is setting out to accomplish
Current Process	Identify the organizational processes that the proposed solution will affect including the training department, other departments within the organization, and relationships with clients, external partners, and the competition.
Requirements	List the resources needed to complete the project including staff, hardware, software, print materials, time, and budget
Alternatives	Identify other potential solutions to implementing the proposed solution. Need to identify the basic requirements for each and estimate the project risks.
Compare Alternatives	Compare and contrast the alternatives with the solution and the other alternatives. State the similarities and differences, benefits, detriments, and costs of each option
Additional Considerations	List the critical success factors for this undertaking.
Action Plan	List the specific steps of the action that is to be taken. State the short term and the long-term action plans including the major milestones.
Executive Summary	Provide a clear summary of the learning solution

In Practice

If you are going to start implementing distance education technologies and methods into your organization, you need to build a strong business case. What can it do for your organization? Where will it have the biggest impact, the best relevance and fit? You need to have a vision and a distinctive point of view. Distance education requires much planning and consideration. Before you jump into this new delivery method, structure your business case and ensure it has the right fit for you, the organization for whom you work, and the learners.

1.9 Benefits of Distance Education

The benefits to the learners of distance education include:

- Accessible training to learners in rural areas
- Ability to complete their course of study without suffering the loss of salary due to relocation
- Exposure to the expertise of the most qualified faculty
- Increased course availability
- Ability to work at own pace depending on the type of distance course
- Increased accessibility to training for a greater diversity of individuals from those who want to take extra courses for their own interest to those companies who want to retrain or improve the skills of their employees
- Increased opportunity for learners to be more independent and involved in the learning process
- Ability to save money due to the elimination of travel expenses
- Improved learning due to better learning techniques which activate the learners, expose them to real-world data, and allow them to develop better thinking
- Adaptability to the learners
- Reusability of the developed modules. The modules can be used again and again or pieces of information (learning objects) can be taken from the course and used to build a new one
- Increased ability to build learning communities and encourage the active participation of training initiatives on a much wider scale than other methods
- Increased accessibility to the facilitators anytime they are wiling to read their email

In Practice

One final point that makes distance education effective is its focus on learning rather than teaching. In other words, the intention is not to transmit knowledge to individuals but to make them active participants in the learning process. The development of various learning theories has changed both the nature of learning as well as the perception of the learner. Knowledge is something that is socially constructed through action, communication, and reflection involving learners. Traditional courses focus on conveying information to the learners but distance education focuses on modeling expert practice and bringing the learners·into the learning process. The word teacher becomes almost meaningless and is replaced by the notion of a facilitator or mediator of the learning process.

1.10 Potential Disadvantages of Distance Education and their Solutions

For anyone entering the distance education field, it is important to point out that it is not without its disadvantages. These are critical for the novice distance educator to know so that they can prepare for any obstacles these disadvantages may cause in the planning and development of distance courses. If you know the solutions to these disadvantages, it will be much easier to plan for effective distance education.

The disadvantages of distance education include:

1. The loss of the subject content
2. Materials are generally available only in English
3. The learning curve for facilitators involved in creating their own online course content may be high
4. Some facilitators feel they do too much facilitating
5. The false assumption that everyone is comfortable in a technology rich environment

Disadvantage #1

The first disadvantage is the loss of the subject content itself. Learners may become so overwhelmed by the technology involved that they may lose track of what the course content is all about and instead focus on learning the technology.

> *Solution*
> To avoid this happening, the facilitator should ensure that the focus remains the instructional content not the technology that is being used to convey the information. Technology assists in creating the best teaching and learning environment. Facilitators should not use assorted technologies for experimentation purposes; they should only use the technologies that will be effective for that particular course(s).

Disadvantage #2

Another disadvantage that may need to be considered is the fact that most of the materials are available in English only. There are translation packages available and websites with dual language features but the majority of resources are found only in English. This is problematic for learners who speak other languages.

> *Solution*
> Trying to find a solution to this is rather difficult because translation software is not infallible. The best the facilitator can do is:
>
> - Use simple language to explain important learning concepts
> - Use daily life examples to facilitate the learners' understanding
> - Create learning activities that can actively involve learners in the learning process
> - Form learner learning teams where learners can help one another

Disadvantage #3

In cases where facilitators are required, there may be times where the learning curve for facilitators involved in creating their own online course content may be high. For some individuals, web-oriented technology can cause a lot of problems. It is not enough for them to know how to edit, save, and print; they also need to know things about file transfer, operating system compatibility, and download time for the various online connections available.

Solution
In cases like this, it might be good to encourage facilitators to communicate with one another so that they can share their teaching experiences and technical skills. Hands-on training classes may also be useful for facilitators so that they feel better prepared to deal with some of the technical problems they may encounter.

Disadvantage #4

While this is not necessarily a disadvantage for all facilitators, another potential problem is that some facilitators feel they do much facilitating and not enough professing.

Solution
Since they really are acting as learning facilitators, they may need to learn a new paradigm of teaching. This may include:

- Organizing learning activities that involve learners in active learning such as role play, task groups, and case studies
- Using different kinds of course tool functions to promote communication between instructors and learners
- Using discussion to monitor the learners' learning process and reinforce content delivery

Disadvantage #5

The final disadvantage is assuming that everyone is comfortable in a technology rich environment. Not all learners have had positive experiences with technology so you have to be aware that these bad experiences contribute to some insecurities and uncertainties on the part of the learners.

Solution
There are certain things facilitators can do to help these learners overcome their fears:

- An assessment of the learners at the beginning of the course is a good way to get first-hand information about their learning experiences and learning styles.
- Facilitators should develop teaching styles that allow them to take into consideration the needs and expectations of multiple and diverse learners.
- Facilitators should give learners specific guidance in using online resources and highlight those that are relevant and important for the content learning.

2.0 Commonly Used Methods of Distance Delivery

Two of the most common technologies used in distance education today are web-based learning technologies and video conferencing.

2.1 Web-Based Learning Technologies

What are Web-Based Learning Technologies

Web-based learning technologies are really technology-delivered learning. The learner is rarely, if ever, in close proximity to the facilitator. Traditional instructor-led classroom sessions are eliminated, adjusted for some different real-time interaction, or replaced with real-time virtual classrooms. Typically, it is delivered via synchronous, asynchronous, or a blend of both types of instruction.

Synchronous Learning

Synchronous refers to live real-time learning or instructor-led events. It has often been termed as being similar to an instantaneous real-life conversation. All parties, including both learners and facilitator, are online together at the same time. "Online" refers to using a combination of audio, video, or email to communicate. Learners are provided with materials, including a course guide and detailed access to someone who provides guidance, answers questions and evaluates learners. This method works best with those who still need some form of conventional learning but also want less direct teaching. The majority of individuals have been shown to learn better and faster with some guidance. To maximize their learning potential, direction and personal contact becomes a requirement.

The facilitator allows the learners to begin learning themselves but their actual "instructional role" comes into play through their ability to grasp how well the learners are learning and how well they comprehend the material that is under examination. The learner does his or her work independently but when help is required the facilitator is able to provide an instantaneous response to their question. The term facilitator replaces the term instructor so that the onus is placed on the learners to take control of their own learning.

Advantages of Synchronous Learning

As a teaching method, synchronous instruction has been shown to have several advantages. First, it increases the learners' level of motivation. The facilitator is there to keep the learners moving so that they will want to learn and finish the course. Second, the design of this learning method is such that one benefits from "telepresence". There are others who are taking the course as well and, just like you, they are trying to learn and acquire new knowledge. Third, assistance is provided to help learners pace their own work so that they do not fall behind and are able to acquire the skills required within a reasonable amount of time. Finally, this method also has more learner retention due to that 'semi-personal touch'.

Disadvantages of Synchronous Learning

While synchronous instruction has been shown to very effective, looked at holistically, it also has certain disadvantages. The most significant problem is the cost. It is very expensive to have a facilitator online with learners at all times. In terms of being cost-effective, this method really falls short. Because of its structure, some learners will not be fully satisfied. Those learners who work best alone and do not function well in a group will find themselves restricted and confined; there is no room for independent learning. In addition, some learners will want to set their own pace and do not like it being set for them. For some, the movement may be too fast while others will find it to be progressing at a snail's pace. This is a group method and it works best for those who are group learners, not individuals.

Asynchronous Learning

Asynchronous refers to self-study or learner-directed study. This type of learning experience relies on a structured plan that directs the learner through the learning experience without any real-time interaction from a facilitator. CD-ROM based tutorials, paper-based correspondence, and "click to learn" web-based systems are examples of this learning format.

Types of Asynchronous Learning

There are generally two types discussed: self-paced and facilitated. The self-paced is totally independent and the learner has no support from anyone. They serve as their own facilitators and whether or not they complete the course is totally dependent on themselves as learners.

The facilitated asynchronous approach is supplemented by interaction with the instructor via email, voice mail, or comments from threaded discussions. The facilitator is available to respond to questions but the degree of companionship and assistance shown in the synchronous model is not available. The learners are provided with a guide that enables the learner to work at their own pace. This is combined with the occasional use of interactive telecommunication technologies for group meetings among all the enrolled learners. Flexibility is the key with this model as the learner can work when they want and how they want. The individual learner is still in control of their learning and they have to be willing to provide their own motivation. All asynchronous learning requires the learner to have a highly developed internal motivation. Failure to have high motivation may result in high failure rates for the learner or high dropout rates.

Benefits of Asynchronous Learning

Asynchronous models, like the method previously discussed, have several benefits and disadvantages. In terms of their benefits, they really do provide an exceptional amount of flexibility that allows an individual to meet the demands of learning while still upholding their other responsibilities. Much time is provided to think and reflect on answers, ideas, and other people's comments. There is no need to have an instantaneous reply; you have the freedom to reply when you want. This model also allows the individual to situate the course content more directly into their working context. As you learn, you have the capacity to apply it to your job because you have the ability to take courses and work at the same time. Finally, this method is definitely less costly than the other method as it does not require a full-time facilitator. For those working on a stringent budget, this method has definite cost-cutting advantages.

Disadvantages of Asynchronous Learning

In terms of disadvantages, this model proves to be problematic for the average learner. Most people do not learn well on their own and require some support. Many people do not have the direction and ambition to work at their own pace and still make tremendous accomplishments. The average person will procrastinate and save things till much later. While it meets the needs of the independent go-getter, those people really are very few in number and having a model for them alone means that many other learners will suffer. In addition, learners want to interact with one another. They want to know that someone else is sharing their experiences and perhaps having some difficulties as well. In this model, you are alone for the most part and that social connection is lost leaving you and your computer as learning partners.

The Blended Learning Approach

The Blended Model combines the tools and methods of self-paced asynchronous learning, facilitated asynchronous learning, and synchronous learning methods into one learning process. It aims to make the learning process more effective with better retention rates and completion rates. It also provides variety in the learner's path to knowledge. The belief beyond this methodology is that independent study and person-to-person instruction best accomplish learning. Independent study provides the opportunity to learn at one's own pace, repeat instructions until fully learned, and to learn on one's own schedule. Person to person instruction brings the learning into perspective through real world experiences and knowledge shared by the facilitator or other learners. The blending of these methods encompasses the best delivery methods to produce a learning experience that far surpasses either learning method alone.

This method requires all Web-based learning methods to be used in coordination with each other to leverage the strength and value of each. This is not a choice of learning methods but a true blending that produces a complete yet flexible learning experience. This is the method we believe to be most advantageous to all learners as it truly meets the diverse needs of all populations.

In Practice

There are a variety of web-based learning options. The choice is going to be dependent upon the learners and what they expect to gain from the training. Asynchronous methods tend to be the easiest to implement due to their anywhere anytime policy. For those who feel their learners are not yet ready to learn on their own in an environment where they have to be self-motivated, synchronous works best. If you want learners to experience both worlds, the blended approach is most effective. Asynchronous is by far the most used approach and it is definitely valuable for those learners who only want to learn certain components of a course and do not feel they need to know all of the content. Learning is much more individualized and you don't need to waste time on acquiring knowledge you already possess or information you do not need.

2.2 Videoconferencing

What is a Videoconference

A videoconference is a live connection between people in separate locations for the purpose of communication, usually involving audio and often text as well as video. It really falls into the realm of synchronous web-based learning. At its very simplest, it provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations.

Videoconferencing allows users to participate in forums, lectures, meetings, and discussions they may have been formerly unable to do due to time constraints, conflicting work schedules, and budget limitations. Using compressed video technology eliminates lodging and transportation costs as well as unproductive travel hours and allows greater flexibility for meeting and class times. It can allow guest lecturers and facilitators at other sites to be incorporated into the curriculum and learners at remote sites are able to share their ideas and experiences. Since the facilitator can see and hear the remote users in real time, they can also use conversation and body language to enhance communication. Frequent interaction increases understanding and encourages more personalized instruction. Interactive teaching strategies such as questioning and discussion can also help engage and motivate learners by making them active participants.

Types of Videoconferencing Systems

There are basically three types of videoconferencing systems:

1. **Small room videoconferencing**: This system is designed primarily for small groups (one to twelve participants) at all sites seated around a conference table.
2. **Classroom videoconferencing**: This type of system usually relies on high quality AV components, codecs, and an interface that allows all participants to be seen on the monitors.
3. **Desktop conferencing**: This system utilizes a personal computer and videoconferencing software. These systems are less expensive but offer limited resolution. They are most effective for individual and small group use.

Video Technologies

There are several different video technologies that can be used including:

- Videotapes
- Satellite videoconferencing
- Cable and broadcast television
- Desktop videoconferencing
- Internet videoconferencing

Videotapes

Videotapes provide a popular and easy-to-use format for instructional materials. They can be used for demonstrations or documentations. They have several advantages in the distance education field. In addition to easy access to the hardware, the tapes are relatively inexpensive to purchase. They are also easy to record. The only downside is that they are not interactive. They also wear out with continual use and can be costly to send via the mail. If you do opt to use videotapes, you should try to record them using the best equipment and, if possible, by professional videographers. Interactions through email, voicemail, and fax should also be encouraged to compensate for the lack of interaction.

Satellite Videoconferencing

This is one of the oldest and most established techniques for videoconferencing. Two sets of equipment are required: the uplink and the downlink. The uplink is a large satellite dish and it transmits the video and audio signals to the satellite. The downlink is a small dish antenna and it receives and displays the signals. When it is used, the classroom must be properly wired for the lighting, microphones, and cameras. The cameras connect to a control room where the signals are controlled by technicians. The resulting television signal is then sent to the uplink transmitter. The receiving sites must have satellite downlinks as these dishes select, amplify, and feed the signals into the classroom.

Satellite videoconferencing is very expensive. It is not cost-effective to use uplinks to originate distance classes unless the organizations are in a position to market the classes over large geographic areas. It is reasonable, however, to use downlinks to receive commercial courses that are delivered through satellite channels.

Microwave Television Conferencing

Microwave transmissions provide a real cost-effective method for videoconferencing in more localized areas. Most of these systems are designed to transmit video signals to areas that are not more than 20 miles apart. The most common systems use frequencies designated by the Federal Communcations Comission (FCC) as Instructional Television Fixed Service (ITFS) stations.

ITFS stations, in comparison to satellite or commercial broadcast television, operate at a lower power and the transmission equipment is not that expensive. The reception equipment is also reasonably priced. The one drawback is the limited number of channels available in any one area.

Cable and Broadcast Television

These technologies have been used to distribute instruction for years. Many public television systems allow schools to transmit television courses. This type of connection can be used to transmit to the community at large or between specific institutions. Distance learning through this approach requires both a studio and channels through which to broadcast. The cost is dependent largely on the partnership offered by the cable or broadcast system. While the broadcast does take place at a scheduled time, research shows that the majority of the students will tape the program and play it back at a convenient time.

Digital (Desktop) Videoconferencing

In this method, a computer is used along with a camera and microphone at one site to transmit video and audio to a computer at another site or sites. The remote sites also transmit video and audio as well. All of the involved computers have a videoconferencing board installed. These boards have the ability to compress and decompress the digitized audio and they are termed codecs or codec boards.

While desktop videoconferencing is less expensive than satellite or microwave systems, there are still some limitations. First, the images are usually transmitted very slowly, at half the normal video speed. This can cause the video to appear jerky if rapid motion is talking place. Another concern is related to the connections between the computers. Most systems are demonstrated through either Local Area Networks or LANs or through fast connections like ISDN or T1 lines. Slower connections can affect the quality of both video and audio in a negative way.

Internet Videoconferencing

Videoconferences can be conducted over the Internet and this is where web-based learning and videoconferencing tends to overlap with one another. A video camera and digitizing card are required to transmit video signals. A microphone, speakers or headset, and an audio card are required for audio. The result is usually a small image on the computer screen and the video tends to be jerky depending on the speed of the Internet connection. In most cases, a regular modem is far too slow to transmit effective data. This method is still in the early development stages and improvements are occurring all the time.

Advice to the Facilitators

When designing instruction to be delivered via teleconferencing, the instructor should focus their attention on all their learners not just those that are at the home site. Lessons should incorporate a variety of activities for all learners at the various sites. Use small group activities, learner presentations, and an occasional break to add variety to the lesson. To keep the learners engaged, facilitators should change their instruction methods every ten to fifteen minutes to ensure that interest is maintained by all of the learners.

With teleconferencing, it is very important that an instructor be able to use all the features of the equipment. A short introductory session that gives a hands-on overview of the equipment features would probably be sufficient. It might also be a good idea to provide the facilitator with a quick reference sheet that outlines all the major functions of the technology that will be used.

Some of the critical operations a facilitator will be asked to perform include:

- Turning on the codec and the monitors
- Dialing the distance site(s) to establish a link
- Controlling camera focus and field at the origination site and at the distanced site (s)
- Adjusting the volume to an acceptable level
- Dialing out to a remote location
- Selecting the appropriate data rate
- Re-setting "echo" canceling capability
- Switching to and from the document camera
- Switching to and from the computer output
- Utilizing a computer to generate and display multimedia presentations
- Using the VCR to broadcast a video for all locations
- Terminating the link with the distance site
- Shutting down the equipment

Sometimes there may be technicians who will assist the facilitators in setting up or monitoring the videoconference. The facilitator should still be aware of the process, however, in instances where the technician is unavailable.

Benefits of Videoconferencing

Videoconferencing is a very interactive medium that has a number of benefits. First, it is almost like being there. The visual connection and interaction among participants enhances understanding and helps participants feel connected to each other. It can also improve retention and appeal to a variety of learning styles by including media such as video or audio clips, graphics, animations, and computer applications.

Videoconferencing technology can also impact student learning in a number of positive ways including:

- Heightened motivation
- Improved communication and presentation skills

- Increased depth of learning. Learners ask better questions and show more understanding
- Audio and video communications. It can provide the visual and audio realism of a face-to-face class.
- Facilitation of personal feelings. Learners and facilitators can see facial expressions and body language, adding personalities to communication.
- High levels of interaction. Most video communications are synchronous and allow high degrees of interactions, questions and answers, and facilitator and learner interaction

Disadvantages of Videoconferencing

The disadvantages of distance education include:

- It may be expensive. Cameras and editing equipment can be very costly. In addition, the infrastructure at each site and the links between the sites can also be costly.
- It can require a great deal of planning and preparation. Faculty members generally need practice and training to be effective in this area.
- It must be scheduled. Most videoconferences are not spontaneous. They must be planned and the necessary resources must be scheduled.
- It may require a technical support team. In addition, site facilitators may be necessary to ensure that the equipment works properly at the receiving stations.

3.0 Instructional Development in Distance Education

An instructional design method is critical to the development of good solid distance education. The facilitator (*if* there is one) and the learners have little if any face-to-face contact and instructional design is therefore paramount to the success of any program.

Instructional design or development provides a process and framework for planning, developing, and adapting instruction based on identifiable leaner needs and content requirements. This is essential in distance education where learners may not have similar backgrounds and generally tend not to have a lot of face-to-face contact. There is an overabundance of instructional models available but all tend to adhere to the same basic stages of planning, design, development, evaluation, and revision.

3.1 Planning/Analysis Phase

In developing or adapting distance instruction, the core content remains unchanged. The presentation, however, requires new strategies and additional preparation time. Some suggestions for planning a distance course include the following:

- Study distance education research findings so you can attain a true sense of the benefits of this method of learning.
- Check to see what existing materials are already available for content and presentation ideas.
- Analyze and understand the strengths and weaknesses of the delivery systems available to you. You need to do this before selecting the instructional technologies to ensure what you have chosen meets your learner needs.
- Hands-on training with the technology of delivery is critical for both the instructors and the learners. It would be nice to have a pre-class session in which the class meets informally using the delivery technology and learns about the roles and responsibilities of technical support staff.
- At the start of class initiate a discussion to set rules, guidelines, and standards. Once procedures have been established consistently uphold them.
- Make sure the site is equipped with functional and accessible equipment. There should be some means by which individuals can report any problems that arise as they are participating in the course.
- If course materials are sent by mail, make sure they are received well before the class begins so that the learners are not at a disadvantage.

If you are new to distance education, you should start with a manageable number of sites and learners. Greater difficulties will occur in the course if you add more sites and learners. In addition, it is important to take great care in selecting the educational modes you want to use in your course. Carefully examine all the technologies and determine which one fits your teaching goal. If you going to be developing several different courses, you may want to spend some time assessing the characteristic needs of the learning audience. You don't want to rely on one technology alone. With your learners in mind, try to use a variety of platforms to address those needs.

Planning for Distance Education

During the planning phase, you are really developing the framework for your course(s). There are certain steps you want to take to properly plan for distance education:

1. **Determine the organizational objectives**
   Before you can begin to design and develop distance learning programming, you need to first analyze the current business and learning objectives that are in existence. You need to study the organization for who you are developing the course to learn as much as you can about what they have set out as their primary targets or goals.

Understanding the organization and their objectives will give you clarity and this is what you need to attain before you can progress any further. Basically, what you are doing is acquiring as much information as possible about the organization so that you can do a thorough needs analysis. This will allow you to see the gap between what is known and what needs to be known in order to clearly attain both the business and learning objectives.

2. **Review any of the existing training strategies**
   It is possible that an organization may or may not have a formal training strategy in existence. If it does, you need to understand the context of that strategy, the stage of execution, and the degree to which people understand the strategy and its implications. If there is no formal training strategy in existence, you need to try and attain an understanding of the mission, goals, and objectives of the organization. Even more important, try to get input from those in the training group and then try to articulate the direction of their training development.

3. **Identify the needs of the stakeholders**
   There will be a number of people who will have a stake in the success of the established training objectives. This interest can be grouped into three categories:
   - *Organizational*: Related to how the training will impact the overall organizational metrics
   - *Technological*: Related to the technological infrastructure and its capabilities
   - *Individual*: Related to the knowledge, skills, and attributes of each individual person

4. **Develop strategies related to critical success factors**
   These critical success factors could be potential obstacles or aspects that enable the execution of a strategy. As the organization moves forward with its e-learning strategy, it is important to develop critical success factors that will be at the forefront.

5. **Map a path forward for the organization**
   It is important to have a clear set of steps that will direct you as you move forward with further distance learning ventures. You should try to establish a future plan that will help learners grow in their training endeavors and knowledge.

3.2 Design Phase

Once you feel you have undertaken sufficient planning, you can move on to the design phase. During this phase, you will undertake three main tasks. You will:

- Determine the need for instruction
- Analyze your audience
- Establish instructional goals and objectives

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Determining the Need for Instruction

To begin, you should determine the need for instruction by considering what external data verify that need, what factors led to the instructional need, and what past experiences indicate the instruction being planned can effectively meet this need.

Analyzing Your Audience

To better understand distant learners and their needs, consider their ages, cultural backgrounds, past experiences, and educational levels. Check to see how familiar they are with the various instructional methods and delivery systems that are being considered, determine how they will apply the knowledge gained in the course, and note whether the class will consist of a broad range of learners or discrete subgroups with different characteristics. Where it is possible, and there is a facilitator, they should visit the remote sites and interview the learners both individually and in a group. This will allow the learners to view the facilitator as more than just an anonymous presence that they connect to via electronic technology. They need to be able to view the facilitator as a real-person not just as a technology extension.

Establishing Instructional Goals and Objectives

Based on the nature of the identified problem as well as learner needs and characteristics, you need to establish instructional goals and objectives. Goals represent broad statements of instructional intent while objectives are specific steps that lead to goal attainment.

Of all the activities involved in the instructional design process, developing objectives is one of the most critical. Learning objectives tell learners what they will learn, understand, or be able to do at the end of a block of instruction. Well-written objective will serve as the basis for test items and will tell learners how their performance will be assessed. They generally have the following criteria:

1. **Performance statement**: List the skill or knowledge that the user needs to achieve
2. **Criteria statement**: Continue to formulate the objective by stating how well the user should be able to perform
3. **Condition statement**: Describe the condition(s) that need to exist for the learner to perform the task

3.3 Development Phase

During the development phase, the tasks to be undertaken include:

- Creating a content outline
- Review existing material
- Organize and develop content

- Select and develop methods and materials

Creating a Content Outline

Once you have established the instructional problems that exist, performed an audience analysis, and determined the goals and objectives for the course, you should then create an outline of the content that is to be covered.

Reviewing Existing Material

You should also review any exiting materials to determine whether they can be of any assistance. You should not, however, use existing material just because it is available or has been effective in the traditional setting. There is no guarantee that the material will hold up in a different environment. This is especially true when examining pre-packaged courses. You cannot just take a course and put it on line; it has to be customized to that particular environment. If already-designed courses are to be used, you may need to wrap around introductions, conclusions, and summaries that specifically relate the learning materials to the instructional context of the distant learner.

Organizing and Developing Content

One of the biggest challenges faced by the distance educator is trying to provide the learners with relevant examples. Content is generally taught using examples that relate the content to a context that can be understood by the learners. If the chosen examples are irrelevant, learning will be impeded. One way to ensure your examples will be relevant is to ensure you have done a sufficient analysis of your learners. This will provide you with the necessary information to ensure you can pick the most appropriate examples.

Selecting and Developing Methods and Materials

When it comes to actually developing your instructional materials and selecting your delivery methods, you may find you need to choose a variety of distance education methods to accommodate the diversity of your learners. You want to ensure that you can integrate a variety of delivery components based on your learner needs, content requirements, and technical constraints. For example, you want to ensure that the delivery methods chosen are in fact available to all the learners no matter where they are located. You want to ensure that everyone has the ability to have the same learning experience and avoid the need to create parallel learning experiences.

Steps to Take in Developing Instructional Materials

The following steps may provide some assistance to you in developing your instructional material:

1. Review instructional strategy.
2. Research existing literature or SMEs to determine the material that is available.
3. Consider how you can adapt existing material.
4. Determine whether you need to design new materials.

5. Consider best media for presentation – how can you best monitor practice and feedback, evaluate learner learning, and guide student learning.

6. Build the instructional material based on the instructional strategy.

7. Review each completed instructional unit for flow, clarity, and information chunking. Keep learner analysis in mind.

8. Develop student manual or student interactions; provide an outline that informs learners of objectives and assignments.

3.4 Evaluation Phase

During the evaluation phase, you:

- Review goals and objectives
- Develop an evaluation strategy
- Collect and analyze evaluation data

Review Goals and Objectives

One of the main goals of the evaluation process is to ensure that the instructional methods and materials are accomplishing the goals and objectives that you had set out in the beginning. Implementing the instruction is really the first actual test you have to see if the program you established will really work. You don't need to test the whole audience but it would be a good idea to test a small sample to see what their reaction is to the chosen content and delivery methodology. If that is not possible, the first test will then be a field test to determine the effectiveness.

Develop an Evaluation Strategy

The next thing would be to develop an evaluation strategy that will help you plan how and when to evaluate the effectiveness of the instruction. There are basically four types of evaluation from which you can choose: formative, summative, qualitative, and quantitative. Formative evaluation can be used to revise the course, as it is being developed and implemented. There can be mini-evaluations scheduled in between each module to see how the learners are progressing in the course. These evaluations will identify the strengths of the course, the weaknesses, technical or delivery concerns, and content areas that may need to be further explained. Summative evaluation is conducted after the instruction is completed and it provides information for course revision and future planning. Following the course's completion, you may want to allow the learners to brainstorm the benefits of the course as well as ways they feel it could have been improved.

Within the context of formative and summative evaluation information may be collected via qualitative and quantitative evaluation. Quantitative research is patterned after experiential research and is focused on the collection and manipulation of statistically relevant quantities of data. Qualitative evaluation focuses on more subjective methods of data collection such as interviews and observation. This way you can attain more open-ended responses from your learners.

Collect and Analyze Evaluation Data

Following the implementation of your course/materials, collect the evaluation data. Careful analysis of these results will identify gaps or weaknesses in the instructional process. Results of the evaluation analysis will provide a "springboard" from which one can develop the revision plan.

3.5 Revision Phase

During the revision phase, you actually think of any additional revisions that may be necessary to make the course the best that it can be for the learners. Even the most carefully developed distance education courses can qualify for improvement and you should always assume that some revisions might be necessary. In fact, there will be much more faith in a course that has been significantly revised than in one thought to be flawless the first time around.

Revision plans are typically a direct result of the evaluation process in connection with feedback from instructional designers, colleagues, and content specialists. The best revision ideas probably come from the instructor and their own personal reflections on the course's strengths and weaknesses. To be truly effective, revisions should be planned as soon as possible after the course has been completed.

Sometimes course revision will be minor but sometimes it may be more in-depth. If major revisions are required, these changes should be made and then field-tested on a sample population to ensure that this time the course actually meets all the objectives and goals that have been set for the course.

Adhering to sound principles of instructional design will not overcome all the obstacles that you may encounter on way to developing effective distance education programs. It does, however, provide a process and procedural framework for addressing the instructional challenges that may arise.

3.6 Instructional Design Summary

Course Topic and General Purposes	- Does the course match the description provided to the learners - Is the course comparable to traditional sessions that may have been offered in terms of content, interaction, and student participation
Student Characteristics	- Have the profiles of the students been reviewed - Have different student learning styles been accounted for - Have prerequisite course knowledge and experience been identified
Performance Objectives	- Do performance objectives meet the course goals - Do performance objectives require varying levels of knowledge - Are performance objectives clear and concise - Are performance objectives measurable
Content	- Is the course content adequate to cover all the objectives that were established - Is the material accurate and current? - Are there any gaps in the information provided
Teaching/Learning Activities and Resources	- Is the material presented in a clear and understandable method - Are different methods of presenting material used to compensate for the varying learning styles - Does the course material presentation provide orientation to other activities - Does the course material presentation provide enrichment opportunities - Is there opportunity for ample student and instructor interaction - Is there opportunity for ample student/student interaction - Is there opportunity for learning through doing, collaborative

	learning or other types of learning • Is there a logical sequence of study which allows the student to move through the course independently within the required time frame • Are there motivational points built into the course • Are instructional resources appropriate to the course and content • Are instructional resources easily available to students
Evaluation	• Do the evaluation instruments measure student accomplishment of the objectives • Are there ample opportunities for students to be evaluated • Are the students provided with ample opportunities for feedback • Does the timing of the feedback provide enough time for learner improvement • Are a variety of assessment methods used to evaluate student performance • Are the students provided an opportunity to evaluate the instruction and course

4.0 Good Elements for Distance Learning Instruction

Besides good instructional design, there are certain elements that contribute to the solid design of distance education courses. These things should be taken into account during the instructional design process. The first important element is interactivity.
Any successful distance education program involves interactivity: between facilitator and learners, between learners, between learners and their learning environment, as well as active learning in the classroom. Interactivity can take many forms in the distance environment. It is not limited to audio and video or to facilitator-learner interactions. If interaction is not included, distance education slips back into the old methods in which it was nothing more than a correspondence course. Efforts should be placed into bringing the learners into the learning process whether it is via simulations, case studies, or brief quizzes or tests. The idea is to provide an authentic learning experience and this can only be provided when the learner is active and involved. Otherwise, they will feel isolated, non-motivated, and will drop out. Distance courses have to work harder to keep their learners motivated and this is why good design is the crux of distance education.

It is also very important for learners to become active participants in the learning process. The way in which they acquire knowledge becomes unique to each individual that participates as they all acquire information in their own way. Learners need to feel some ownership of their learning goals and they must be willing and able to receive instructional messages. How much effort an individual will exert in the learning process depends upon their perception of two factors: the relevance of the medium and the message it is trying to convey and their ability to take the presented information and make something meaningful out of it.

Visual imagery is another important element that can be critical in the learning process. It is not enough to hear the information alone; more benefits are often reaped when visual images are conveyed as well. For example, if a particular process is being described then the best way to convey this information may be to animate and illustrate it visually. This is not to say that we fall victim to the edutainment industry but rather that we try to make the learning as meaningful as it can be for the learners. The entertainment component should not take precedence over the learning component. Exciting visuals may move the focus from the learning and toward the entertaining component of the process. All learners need to discriminate between junk information and quality information. They need to be able to judge the reliability of the information, to identify inherent problems, to distinguish facts from persuasion, and to understand the role that technology plays in shaping and conveying that information.

Finally, it is very important that a good designer design for their target audience rather than for themselves. The outlook of the learners may be very different than that of the designer. If you want learners to construct ideas similar to the ones you have in mind, then you need to use a presentation that will trigger a similar idea in the learner's mind in the context of the learning environment and the learner's prior experience. While no two learners will see things in exactly the same way, nor will two designers create materials in the same way. It is up to the designer to:

- Use advance organizers to create an appropriate context for instruction
- Select effective images using appropriate objects with relevant attributes that will convey the same idea to the user that they did to the designer

5.0 Challenges for Distance Education

5.1 Technical Difficulties

Technical difficulties are common and software will encounter some problems that are inevitable. Things may work well one day and not the next. This is why technical support is a necessary component of distance education. Any good distance education course will plan for technical support. All the potential issues will need to be examined including:

- How will the learners obtain the required tools and technologies?
- Who will answer questions?
- Who will help learners when there are problems?

- How will facilitators receive training?

Potential Solutions to Technical Problems

Some of the things you will need to do to prepare yourself for any technical problems include:

- You will need to plan for any disasters that may occur. Assume the worst that could possibly happen and prepare for that. How will the learners recognize the problems and know how to act? How long should they wait for the problem to be corrected by someone else? What actions should the learners take on their own? How do learners continue to learn while problems persist? Facilitators and learners should know how to contact one another in case a server or network failure disables Web/email channels. Learners should be provided with the instructor's phone number and address, the contact information for checking on network and server availability, and alternate non-network resources.

- Support should also be consolidated where multiple courses are being implemented. Courses built on the same technology will share the same common technical support resources such as an FAQ file, tutorials, test pages, setup activities, and a Help Desk.

- Technical barriers should be identified. It will be possible to attain more learners if the requirements are reduced so that more learners can attain them. Don't require unnecessary technology that is optional and not a requirement. Don't have features or media that are not needed, require that learners have an up-to-date browser, and do not require learners to download more than they actually need.

- Select supported technologies. Buy or implement technologies fully implemented by vendors. Try to use browsers, plug-in delivery systems and other tools that:

    - Have 24 hour seven day a week telephone support and web-based troubleshooting
    - Complete documentation and tutorials
    - Reliable auto-install and uninstall programs
    - Do not require the users to have to lower their settings. Establish minimum requirements but enable the courses to run on systems that clearly exceed these expectations.

- Limit the number of new technologies that are being used. Consider using technologies that learners are already familiar with. Conduct surveys to see what the learners use.

- Simplify and integrate technology. Once the technology is chosen, determine how to provide these technologies so learners are not overwhelmed with unnecessary complexity. Simply chosen technologies.

- Pick multi-purpose tools, those that can handle multiple functions. These would include:

    1. Media players which are capable of playing several video and sound formats
    2. Collaboration tools that provide chat, whiteboard, screen sharing audio-conferencing and video-conferencing. Collaboration tools reduce incompatible

programs running at once, separate files the learner must download and install, use interfaces the learner must master.

The learners will be required to have some computer skills. It is important to let the learners know what the technical requirements are and how they can meet them. Good facilitators and technical support as well a well-developed distance course will:

1. Help the learners meet the course requirements. Don't leave them on their own. Enunciate the requirements and provide the resources to test compliance and meet the requirements.

2. Specify the requirements fully. List all the hardware and software that is required, specify the problems learners will encounter if they cannot meet the requirements. Give them choices and let them make the compromises that are required. Identify alternate browsers and software. Include links to pages for testing whether or not the learners' systems meet the requirements.
   - In terms of hardware you will want to identify which kind of computer can be used, whether the learners' computer is compatible, and any special hardware that they may be provided.
   - You may want to specify the operating system that the course runs on – the display settings, the browser version and settings.

3. It might also be a good idea to create necessary support resources such as:

   - Help file covering the procedures and tools of the course
   - FAQ file
   - Tutorial or instructions
   - Discussion groups for technical problems
   - Interactive troubleshooting guide
   - Downloadable manuals for course delivery software, collaboration tools and media players
   - Phone numbers and hours for the help desk
   - Web form for requesting assistance or reporting problems

5.2 Functional Aspects to Consider

Regardless of the type of distance education chosen, there are several functional aspects that need to be considered. The first is the use of authoring tools or rather multimedia creation tools. These are typically used on an individual computer by a multimedia professional to create media that can be either stand-alone or added as a module into a management system. These tools can range from things as simple as Microsoft PowerPoint to more sophisticated tools like Macromedia's Director and Authorware software.

Real-time virtual classrooms are products that facilitate the synchronous, real-time delivery of content or interaction by the web but it is not really intended to measure performance over time or handle administrative tasks. Netmeeting, Placeware Auditorium, and Centra One are examples of these real-rime virtual classrooms.

Learning management systems embrace all of the learning management and asynchronous delivery tools. In an LMS, learners are generally provided with an integrated view of all their active coursework and assignments as well as comprehensive goal assessment and goal tracking. Within the LMS, there are three subsets of tools:

1. **Course Management Systems**: This is a type of LMS that facilitates web delivery and management of facilitator-led courses and provides integrated tools for measuring and reporting progress for individuals or groups of learners. They tend to be very textual and are templated to provide ease of use but limited flexibility. Some common examples include Blackboard and WebCT. They generally consist of functions including Content Manager, asynchronous collaboration, and a learning record keeper. It may include limited authoring tools.

2. **Enterprise Learning Management**: This is a type of LMS that provides teams of developers with a platform for organization and delivery for a variety of content types. In comparison to CMS systems they are rather expensive and require significant customization. Examples include Knowlesoft Enterprise and Sun/Isopia ILMS. These types of management systems add "learning portal", "competency management systems" "pre-testing and assessment tools" to the list of characteristics found in a course management system.

3. **Learning Content Management Systems (LCMS):** This is very similar to the standard LMS but it is enhanced with strong authoring tools and the data management capabilities of a knowledge management/ enterprise system.

A good LMS is really at the core of distance education. They manage the delivery of online content to students and manage communication functions as part of the learning process. Many incorporate student management functions such as recording enrolments and student progress (proprietary products like WebCT and Blackboard). LMSs plan, implement, and assess a specific learning process. They can provide facilitators with a way to create and deliver content, monitor student participation, and assess student performance. It can also provide learners with the ability to use interactive features like threaded discussion groups, videoconferencing, and discussion forums.

6.0 Critical Success Factors to be Considered in Implementation

There are more factors to consider in successful distance education than simply good instructional design and up-to-date technology. While these issues are often overlooked due to cost restrictions, they do play a substantial role in whether the program will or will not be successful. After you have put together a distance education program, these are issues you may want to examine and improve on the next time around. Like any new thing that is being implemented, there will be a learning curve.

Learning Management

The first prevalent issue is learning management. It is important to discover how distance education was introduced or incorporated with the existing training or education programs and services. It is important to discover whether learners were open to this new method of instruction or whether there was any evident resistance.

Other issues surrounding learning management include:

- Whether distance education replaced a more conventional system of learning or whether a blended approach was utilized. If the blended approach was the chosen methodology you may want to discover how this affected the acceptance and effectiveness of the training, as this is closer to the traditional perception of education.
- Whether a Learning Management System (LMS) is being used and whether that provides a clear training program and pathway to upgrade skills and knowledge. If an LMS is not in existence, you need to know how students will get access to the course, how they will become enrolled, and any potential impediments to enrolment that learners may encounter.
- Whether the program being offered is part of an accreditation program. If it is not, it will be interesting to discover how this impacts the enrolment numbers.

Content Management

The next prevalent issue you may want to consider concerns content management. This includes:

- Whether the resources assigned to maintain the course (both human resources and budget resources) will be doing so on a regular basis. If they are not doing this, you will need to discover how this is going to affect the sustainability of the training.
- Whether a plan has been established with regard to initiating, writing, approving, and publishing content changes. If no plan has been considered how will these affect the course content? Will maintenance be delayed, executed incorrectly, or not executed at all?
- Whether a user-friendly form-based environment will facilitate content management or whether technical resources (such as programmers) will be required. You need to consider how this will affect the course creator(s) ability to maintain their course.
- Whether the course material is subject to frequent changes.

Marketing and Communication

The next issue concerns marketing and communication. There should have been a sound communication plan established before the course was planned or designed. You need to know how the course owners made stakeholders aware of the training and whether the plan took into consideration ongoing communications that would maintain the course's sustainability. You will also want to re-examine the details of the marketing plan that was put forth for the program. How did the owners market the course? Did the plan take into consideration ongoing marketing to ensure the course's sustainability? Were there any incentives offered to those taking the course? Finally, did all the major stakeholders buy into the course?

Implementation Plan

Another consideration is the implementation plan for the course(s). Was there an overall implementation strategy established and if so what were the details of that plan. Check the plan to ensure you have met everything that was identified in as clear and concise a way as possible. Ensure that the IT department or host provider was involved in the process early enough to eliminate unnecessary technology problems and incompatibilities. If these problems seem to be a persistent thing in the course, perhaps next time around these individuals can take a more active role in the process. It is normally a good idea to create a prototype or pilot first to assess the validity of the course. Basically, this provides you with a benchmark by which you can compare the actual course.

The Nature of Change Management

Next, you want to think about the nature of change management. Ensure that the facilitators were involved in the process of adopting the tools. If they were not, they will probably not be as adapt with the technology as they could possibly be had they received the proper instruction. You want to ensure that they were involved in the entire process and if they were not, the consequences of that action must be examined.

Learner Support

Finally, you want to ensure that the learners receive proper support throughout the entire learning process. Was a technical support desk put into place or was one required? Did having one benefit the learners? Did not having one affect the ability of the learners to solve the technical problems? You also want to ensure that adequate support was provided to the learners throughout the course. A good idea is of course to provide the learners with a brief introductory session where they learn about the technology and how the course will operate. If such a session is offered you want to see whether or not things were easier for the learners. This feedback can easily be attained through an end-of-course evaluation. Some other things you may want to discover are:

- How did the facilitators feel about this new method of learning? Did they feel like they had adequate support?
- Did the learners feel isolated or did they feel like they were part of a supported network of learners?
- What types of online tools proved to be effective for supporting the learners?

7.0 Best Practices for Distance Education

The following documented information identifies the best practices that exist for distance education:

1. **Where it is applicable, facilitators and designers must maintain academic control at all times of the instruction.**
   Instructional designers and facilitators must be proficient in the type of technology that is used in distance education courses.

They must be prepared to design courses that take full advantage of the potential of the medium in which they are operating. They must possess the strategies and skills to communicate with learners electronically in the absence of visual and oral cues.

2. **Faculty must be prepared to meet the special requirements of teaching at a distance.**
   This is especially relevant for synchronous courses like videoconferencing where knowledge of the technology is a requirement. Training will need to be provided in terms of hardware, software, and troubleshooting. It also helps if the facilitators work closely with knowledgeable instructional designers who may be able to assist in the design of the courses.

3. **The course design should be shaped to the chosen medium.**
   The idea is not to simply replicate the traditional classroom but to improve and build upon traditional learning. The design of distance education courses- planning, class projects, visual aids, and library materials -should be approached not in terms of replicating the classroom but in maximizing the potential of the medium that is to be employed.

4. **All learners must understand the course requirements and be prepared to succeed.**
   Successful distance education learners need to be highly motivated and, if not, the success rates are less than favorable. Strong communication skills are also an asset when it comes to having to communicate with the facilitators as well as other learners. You also want to ensure that the learners are made aware of the fact that distance education is not easier than traditional education. If you want to ensure that all learners succeed, you have to provide them with the necessary information required for success. These elements include:
   a. Clear statement of course requirements in advance including course requirements, weekly time commitments, computer skills required, and assorted practical difficulties. These things could be provided through same time same place video or Internet based orientation programs
   b. Training must be provided in advance of the courses to those who have the appropriate equipment but do not know how to use it properly. Advice should also be provided to those who have problems with their written communication and motivation skills.
   c. Reliable extended-time technical support will need to be provided throughout the course. You will need to specify the nature and extent of the technical support to be provided

5. **Close personal interaction must be maintained.**
   This is the most important challenge – to develop a rich level of personal interchange between learners and facilitators and learners themselves. One good way to do this is to utilize email, electronic discussion groups, telephone, mail, fax, and audio/video conferencing. To maximize communication electronically, distance education courses should try to incorporate both real time electronic interchange through things like chat groups and discussion groups and through asynchronous forms of communication such as email and bulletin boards. Opportunities for same-time, same-place interchange between teacher and learner or among learners should also be built into the distance course.

Communication technologies that increase access to support systems, help them share useful resources, and provide for joint problem solving and shared learning car augment any face-to-face contact or lack of face-to-face contact. In some cases, technologies can strengthen faculty interactions with students especially in the case of students who are shy, reluctant to ask questions, or challenge the facilitator.

Email, threaded discussions, computer conferencing, and the World Wide Web increase opportunities for students and facilitators to converse and exchange work more speedily than before. Communication increases and the result seem more intimate and convenient.

6. **Class size should be set through normal faculty channels.**
   More time should be required for personal interaction and there should be smaller faculty-learner ratios in distance education because there is so much information that needs to be monitored. Education should drive the entire process, as should learner involvement in their learning.

7. **Courses should cover all materials.**
   The amount of material covered in a distance education course and the depth with which it is covered should equal that of a classroom-based course.

8. **Experimentation with a broad variety of subjects should be considered and encouraged.**
   Some individuals say it is difficult to teach certain subjects but in reality almost any subject can be taught via distance. You can incorporate labs, simulations, and practicums into distance education. Any subject should be attempted but, if it turns out to be unsuccessful, it should either be revamped or avoided as a potential distance education choice.

9. **Equivalent research opportunities must be provided.**
   There should be numerous opportunities for learners to conduct independent research. Learners need to have access to a broad spectrum of research materials in all formats and learn how to evaluate material critically. There should also be opportunities for distance education learners to conduct independent course related research and these opportunities should be the same as those provided to any learners.

10. **There should be comparable learner assessments provided to the learners.**
    The level of achievement expected should be as challenging as that of the traditional classroom. Differences in electronic and classroom education techniques may dictate that different forms of assessment be used or at least there should be a different emphases when it comes to assessment.

11. **There should always be a comprehensive evaluation of all distance education coursework at all levels both qualitative and quantitative.**

12. **Good distance education develops reciprocity and cooperation among students.**
    Learning is normally advanced when it becomes more of a team effort rather than a single competitive race to the top. Good learning should be cooperative and social. Sharing ideas and responding to others improves thinking and deepens understanding.

13. **Good distance learning uses active learning techniques.**
Learning does not readily occur when people simply sit in class listening to teachers, memorizing assignments, and spitting out answers. To learn effectively, learners need to talk about what they learn, relate it to past experiences, and apply it to their daily lives. The learning must become part of them. Therefore, the good instructional designer and distance educator will do everything they can to make learners active participants.

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